REPORT

OF THE

Indian Tariff Board

REGARDING THE

GRANT OF PROTECTION TO THE SERICULTURAL INDUSTRY

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PRELIMINARY.

Terms of Reference.

The enquiry into the sericultural industry was referred to the Tariff Board under the Resolution of the Government of India in the Department of Commerce, No. 607-T. (1), dated the 3rd December, 1932, which runs as follows:—

> " It has been represented to the Government of India that notwithstanding the existing high revenue duty on imported raw silk the recent increase in imports of that commodity from foreign countries constitutes a grave menace to the existence of the indigenous sericultural industry. It has therefore been decided that the claims of the industry to protection should be the subject of an enquiry by the Tariff Board. The Board is requested to examine the following questions and to make recommendations:—
>
> (*a*) whether, having regard to the nature and extent of the competition of raw silk from foreign countries, the claim of the sericultural industry to protection has been established; and
>
> (*b*) if the claim is found to be established, in what form protection should be given and to what extent.
>
> 2. In making its recommendations the Board will take into account all relevant considerations including those stated in parts (*b*) and (*c*) of the Resolution adopted by the Legislative Assembly on the 16th of February 1923. In particular, the Board is requested to consider how its recommendations will affect the handloom weaving industry.
>
> 3. Firms or persons interested who desire that their views should be considered by the Tariff Board should address their representations to the Secretary to the Board."

The Board's Communiqué.

2. On receipt of this Resolution the Board issued on the 5th December, 1932, the Press Communiqué reproduced below which outlined the scope of the enquiry and invited representations from firms and persons interested who desired that their views should be considered by the Board:—

> " The Government of India in their Resolution No. 607-T. (1), dated the 3rd December, 1932, have directed the Tariff Board to enquire into the question of granting protection to the indigenous sericultural industry.
>
> 2. The Board has been instructed to examine the claim of the industry to protection and its attention has been specially drawn to the following points:—
>
> (1) whether the three conditions laid down in paragraph 97 of the Report of the Indian Fiscal Commission are satisfied, and

(2) the effect upon the Customs revenue of the Government of India of any protective duties which may be recommended.

3. The Board has also been requested to consider how its recommendations will affect the handloom weaving industry.

4. Any persons or firms who desire to claim protection for the industry in India or who consider that the present rate of duty *qua* revenue duty should be maintained, are requested to submit to the Tariff Board a full statement of the grounds on which they do so. Persons or firms who claim protection should state *inter alia* the grounds on which the industry can be considered to fulfil the conditions laid down by the Fiscal Commission, and whether any protection which may be found necessary should be given by means of protective duties or in any other form.

5. Firms or persons interested who desire that their views should be considered by the Board should address their representations (with six spare copies) to the Secretary, Tariff Board, Old Custom House, Bombay, so as to reach the Board's office not later than the 24th December, 1932. On receipt of such representations the Board will issue, as early as possible, a questionnaire setting out the points on which detailed information is required. The dates for the public examination of witnesses will be notified in due course."

Peculiarities of the enquiry.

3. The sericultural industry, though its aggregate production is small, is scattered all over India from Kashmir in the north to Mysore and Madras in the south and Bengal and Assam in the east, while there is no part of India where silk handloom weaving is not carried on. The production and reeling of cocoons is carried on in remote villages away from the main highways of travel and commerce, on the other hand raw silk is woven in large and middle sized towns. We had therefore to tour in out of the way places over a wide area in order to make our enquiry thorough and complete. Again the industry is carried on in four distinct stages—silkworm rearing, cultivation of the food plants for worms, reeling cocoons to obtain the raw silk of commerce, and preparing the raw silk for use by the weaver. At no place are all these different stages integrated, except where the worm rearer grows also the food plant, but they are only linked together by a series of middlemen charging varying rates for commission and transport. So that our enquiry into the final costs of the finished products resolved itself into an enquiry into the separate costs at each stage. The complexities of our enquiry were further increased by the fact that silk worms are of different kinds; some are reared in the jungles and forests of Assam, Bihar and Orissa and Central Provinces, others on the mulberry farms of Bengal and Mysore. Even the mulberry worms—the variety to which we have devoted the greatest attention, differ from each other in racial characteristics, the num-

ber of their crops per year, the amount of silk they yield and the amount of food they consume. The mulberry is grown both as bush and tree under varying conditions of climate, soil fertility, irrigation facilities, agricultural practice and land revenue settlement. Reeling is carried on under different types of business organisation ranging from the cottage method to the factory form under individual or State control. All these different considerations have rendered the process of ascertaining costs of production anything but easy. Most of the producers at each stage being either peasants or cottage workers do not keep any accounts and the task of collating the information painfully collected by local Governments from them was beset with special snares on account of the different local weights and measures in use and the different systems of averaging adopted. Nor was the collection of information from the other side of the comparison—namely the import side—free from difficulty. The Chinese silk industry, the principal competitor of the Indian industry, is almost equally unorganised and unprovided with reliable statistics and we were greatly handicapped by an imperfect Customs classification of the Chinese imports. The prices of articles which we were investigating kept on changing with the marked fluctuations in Chinese exchange brought about by Chinese currency changes, the world speculation in silver and the American economic disturbances which occurred during the course of our enquiry. Some of these prices were further affected by the tariff changes made during the last Indian budget session. All these considerations have operated to extend the period of our enquiry beyond the limits which we had imposed on ourselves when we started on our work.

Tour programme.

4. From the 18th to the 23rd December, 1932, we were at Bangalore and Mysore and visited the silk filatures, silk weaving and throwing factories situated in these stations. We also toured in villages where sericulture is practised, had interviews with several sericulturists and studied in detail the organisation and working of the industry and the various measures adopted by the State for its benefit. We then settled at Poona where from the 25th December 1932 to 10th February 1933 we were occupied with the drafting and issue of questionnaires and the study of the replies received. During this period we visited some typical silk handloom weaving centres in Poona. On the 12th February we arrived in Delhi and recorded the evidence of representatives of the Kashmir Government. We next visited Malda, the largest centre of silk production in Bengal, where we held discussions with the Collectors of Malda and Murshidabad and recorded evidence. In Calcutta we took the evidence of the representatives of the local Government and met several persons interested in the industry including a member of the Bengal Silk Committee; we left on the 25th February for Bombay where we examined the representative of the local Government and some silk importers and handloom weavers. Since the 8th March the Board has been in Bangalore, taking oral evidence

and visiting some of the silk rearing areas which could not be visited in December owing to lack of time, and drafting the report. On the 19th March the Board visited the sericultural sections as well as the silk reeling preparation and weaving sections of the Government Textile Institute, Madras. A detailed list of the places visited and witnesses examined will be found in Appendix A.

Acknowledgment.

5. We desire to acknowledge the assistance which we received from the witnesses who appeared before the Board to give oral evidence. Our special thanks are due to those gentlemen both official and non-official who made arrangements for our comfort in various places, and particularly to the Mysore Government, for their hospitality to us during our first visit to the State and for their prompt and willing response to many requests for information.

Personnel of the Board.

President . .	Mr. Fazal Ibrahim Rahimtoola.
Members . .	Mr. G. T. Boag, C.I.E., I.C.S. Mr. H. R. Batheja, I.E.S.

सत्यमेव जयते

Report regarding the grant of Protection to the Sericultural Industry.

CHAPTER I.

The Sericultural Industry.

Origin of sericulture.

The origin of the silk industry is lost in antiquity. According to all accounts however it had its beginning in China. Owing to its delicacy and artistic appearance, silk has always been esteemed as the most appropriate material for the dress of princes, specially in warm oriental countries. The importance of its discovery has therefore never been underestimated by historians. The Chinese worship with divine honours under the designation of the Silkworm Goddess the Empress Si-Sing-Chi who is first supposed to have invented the art of reeling silk from cocoons and fashioned it into a fair garment about 2,600 years before the birth of Christ. It is somewhat in the fitness of things that the invention of the fabric which is now predominently used by the fair sex should have been ascribed to a woman.

Expansion of the industry.

2. It is said that the new invention was for a long time kept a jealously guarded secret; but in spite of all precautions, it gradually spread from Shantung, the reputed province of its origin, to all parts of China and from thence to all parts of the civilised world where the conditions were favourable for its successful practice. The line of expansion roughly followed the world trade routes by which Chinese silk was exported to the different parts of the ancient world. On the east the sericultural industry travelled to Japan *viâ* Korea, on the south it overflowed into Cochin-China, Siam and Burma and on the west it travelled by the ' silk road ' to Central Asia, Persia, the Levant and South Europe. Attempts have been made to transplant it in suitable parts of America, *e.g.*, California, but the high wages prevailing there have ruled it out as an economical proposition. From Europe the industry has been carried by white settlers to such parts of Africa—specially its southern portions—as are suitable for its growth; but generally the obstacles to its practice in America apply equally in the dark continent.

Factors governing the distribution of the silkworm rearing industry.

3. The broad factors governing the distribution throughout the world of silkworm rearing as distinguished from the later stages of the silk industry are climate and soil, the comparative yield from other competing crops or occupations, overpopulation resulting in the need for an industry subsidiary

to agriculture and the social and religious habits of the people. Mr. Maxwell Lefroy, who was employed with Mr. E. C. Ansorge by the Government of India in the early years of the war to study the condition of the sericultural industry in India, in the report which he made in 1916, attributed to this last factor an importance which in our opinion does not now apply. He thought that orthodox Hinduism and Buddhism, on account of their rooted objection to the taking of life, such as the killing of the silk moths before they emerge from the enclosing cocoons, offer, wherever they prevail, a real obstacle to the growth of the sericultural industry. Experience from Mysore and Madras has however proved that the lure of economic gain is so great that the industry is practised by all sections of the population including such orthodox castes as Brahmins and Lingayets. Those who have such conscientious objections to taking life as outweigh all economic considerations manage to appease their qualms by selling their cocoons before the life of the pupa is extinct. No difficulty seems to be felt on this ground in the Buddhistic countries of China and Japan which are at present the principal centres of silk production in the world, though it probably exists in Burma.

The climatic factor.

4. Climate is undoubtedly the most important factor in the successful establishment of the sericultural industry. The silkworm can thrive only under certain conditions of temperature and humidity and in those areas where its food can be grown successfully and economically. Those conditions can be greatly modified by evolving new varieties of races of worms and their corresponding foods but nevertheless the limits imposed by this factor cannot be entirely evaded. There are many varieties of silkworms of which the silkworm feeding on mulberry leaves is by far the most important. We shall confine our attention mostly to this type of worm throughout the report but shall refer briefly to the other varieties found in India such as the *tasar*, *muga* and *eri* in Chapter III. The mulberry silkworm is now mainly reared on a belt of land encircling the world between 42° and 20° Latitude North. This belt runs through Spain, the south of France, Italy, Hungary, Jugoslavia, Bulgaria, Greece, Asia Minor, the Caucasus, Cyprus, Syria, Persia, India, Cochin-China, China, Japan and the southern part of the United States of America. The belt is broken at certain places or bulges out at others on account of the operation of exceptional climatic circumstances or of the other factors such as soil, population and economic competition.

Other Factors: Peculiarities of the sericultural industry.

5. It is broken clean across the United States because there high wages prevail, the attractions of competing crops and occupations are greater and the population is not so excessive that such a low paid supplementary cottage industry as silkworm rearing may offer any appreciable advantage. Sericulture has always been a poor man's occupation generally incidental and allied to the main profession of agriculture and is therefore followed with the best chance of success in such densely populated

areas as China, Japan, India, Southern and Eastern Europe, where agricultural wages are low, holdings are small and uneconomic and the agriculturist has time to spare between one crop and another. Wherever sericulture has been tried as a large scale organised industry, it has generally failed. These economic considerations have precluded the possibility of making a success of the industry in the southern hemisphere in the corresponding latitudes where the climatic conditions are favourable.

Principal centres of production and their comparative advantages.

6. All the factors mentioned above favoured the production of silk in China and from time immemorial that country has been the home of the silk industry. The operation of these factors can however be greatly assisted by individual effort and public organisation. These special factors have been responsible for the vigorous growth of the industry in France and Italy. All the great improvements which have been made at each stage of the industry, such as the evolution of new varieties of mulberry or new races of silkworm, the production of disease free eggs, the invention of better reeling, throwing and weaving machines and the adaptation of the various processes to factory production are the products of French or Italian genius. Thanks to these improvements and to the extraordinary efficiency with which the industry is organised at every stage, these countries have been able to hold their own, though the economic factor has steadily gone against them. In the early stages, the absence of communications gave them a sheltered market in Europe until the East India Company came upon the scene with its growing supplies of Bengal silk reeled in its own filatures. Bounties designed to secure improvements at every stage, specially in the reeling and weaving process, enabled the French industry to withstand this competition from the East; and the researches of Pasteur saved the industry when it was threatened with extinction on account of the *pebrine* disease. It was only towards the end of the nineteenth century that Japan having adopted all the latest Western improvements entered the field as a serious world competitor, and quickly made a complete capture of the growing and important American market. The growth of silk exports from Japan has generally coincided with the decline of exports from India, until Japan has become the largest producer, or at least the largest exporter, of silk in the whole world. Though China has made great improvements and its exports have steadily grown in the twentieth century, the absence of those factors of State aid, technical efficiency, and marketing organisation which Japan has borrowed from Europe have reduced it, in spite of its vast natural resources, to the second place as a producer and exporter of raw silk.

Relative shares of different countries in the production of silk.

7. Japan is now roughly responsible for 65 per cent. of the total known world production; next comes China with 20 per cent., next Italy with 10 per cent., leaving 5 per cent. for the rest. On the consumption side the United States occupies the first place, roughly accounting for 70 per cent.

of the total known world consumption. These percentages are not exact as we have no reliable figures of the large quantities of raw silk which are produced and consumed in India, China and other parts of Asia where no proper statistics are maintained. We shall attempt to estimate the Indian production and consumption in greater detail in Chapter II. The world's known production or exports in 1931 has been estimated by Mr. Norton Breton, Chairman of the Advisory Committee on Sericulture of the London Imperial Institute, at 48,000 tons or about 100,000,000 lbs. and the share of the British Empire in the total export trade at $\frac{1}{3}$ per cent., most of which came from Cyprus and Kashmir. Recently even these limited Empire supplies have stopped, as the Cyprus filature has ceased to work, and we have been informed by the Kashmir Government witnesses that since March, 1932, foreign exports of Kashmir silk have entirely ceased.

8. The following Table giving the statistics of world production of raw silk for each principal centre from 1920 to 1929 has been taken from the League of Nations Statistical Year Book of 1930-31, the latest issue available to us.

Statistics of world production

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TABLE I.

Raw Silk.

Production or Exports in metric tons.

Country.	1920.	1921.	1922.	1923.	1924.	1925.	1926.	1927.	1928.	1929.
ASIA. (1)	..	..	..	34,810	37,761	42,750	46,215	48,513	52,475	54,900*
Korea.* (2)	455	450	485	665	777	909	1,011	1,132	1,192	...
Japan	21,877	23,395	23,991	25,335	28,414	31,066	34,349	37,051	39,691	42,346
Syria and Cyprus	..	..	..	185	270	250	265	270	280	290
Turkey	..	..	..	60	90	95	70	80	125	135
China* (E)	6,305	9,130	8,675	8,370	7,935	10,155	10,190	9,675	10,897	11,490
British India (E) (3)	80	85	75	50	35	30	55	80	60	20
Indo-China (E) (4)	15	20	25	40	45	60	65	60	50	40
Turkestan, Caucasia and Persia (E)	..	..	..	105	195	185	210	165	180	325
EUROPE	..	..	..	5,513	6,020	5,123	4,580	5,445	5,630	5,660
Spain	80	60	77	70	95	100	85	83	79	74
France	250	195	198	255	335	260	240	295	205	195
Greece	..	35	56	58	75	88	100	125	175	175
Italy	3,326	3,206	3,735	4,900	5,255	4,380	3,855	4,627	4.836	4,826
Other countries (5)	..	..	..	230	260	295	300	315	335	390
Total	..	..	..	40,323	43,781	47,873	50,795	53,958	58,105	60,560*
Price in gold francs per 1 kg. of Milano (6) Classic 8/10 to 12/14.—XII.	..	..	..	86·04	68·82	76·93	73·91	52·35	60·36	48·17

(1) Asia: totals represent in part exports and are consequently too low.
(2) Korea: estimated on basis of production of cocoons.
(3) India: exports from Bengal and Kashmir.
(4) Indo-China: exports from principal harbours.
(5) Austria, Bulgaria, Hungary, Roumania and Jugoslavia.
(6) Italy: price end 1930, 30·44 gold francs.
* Estimates.
(E) Exports.

The figures of production for Asia as a whole, and for China and India, are greatly underestimated, as reliable statistics of silk produced and consumed internally in these countries are not available. The figures in the Table against these countries represent only exports. We estimate in Chapter II that the total production of Indian mulberry raw silk at the present day is a little over 2 million pounds, so that, presuming that the known world production has fallen 20 per cent. on account of the depression from 60,500 tons in 1929 to 48,000 tons or 100 million pounds, India's share in the world's total known production does not exceed 2 per cent.

The trend of world production.

9. The trend of world production disclosed by these figures shows that, while production in the last 12 years has on the whole decreased in Western Europe and India, it has increased in Eastern Europe and gone up by leaps and bounds in Asia as a whole and especially in China and Japan. At least the exportable surplus in these countries has enormously increased. Even Italian production has declined since the peak year of 1924. On the whole these facts support our broad generalisation stated above that the industry is only economically suited to poor and densely populated agricultural areas.

World demand.

10. We have no satisfactory means of estimating the total world consumption of raw silk, as reliable statistics of consumption in Asia where silk is largely used both for ceremonial and ordinary purposes are not available; but all price indications show that consumption has not only failed to increase with the increase of supplies, but has actually diminished. The price in gold francs of one kilogram of Milano classic silk of 8/10 to 12/14 denier fell, as Table I will show, from 86·04 in 1923 to 48·17 in 1929, while it was as low as 30·44 at the end of the year 1930. Silk in its lower form is no unimportant item in the sinews of war. Besides its normal uses as an article of dress and for electric insulating material, it was employed in large quantities during the Great War for surgical dressings, cartridge bags, balloons, parachutes. "There was hardly any branch of warfare in which silk goods were not in demand in some form or other."* This extraordinary war demand was responsible for the great rise in the prices of raw silk and the great extension of mulberry cultivation which took place in the war years. To some extent the demand was kept up after the war by the post-war boom, in which the whole world shared, and specially by the phenomenal prosperity which the largest consumer, the United States of America, enjoyed before the Wall Street crisis in 1929. Record prices were obtained in 1920. From that year they fell slowly but steadily, showing that consumption was lagging behind production, until they crashed at the end of 1929 along with the prices of all other commodities. Silk being an article of luxury with an elastic demand, the fall in its price, as might be expected, was specially

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* Rawley—Economics of the Silk Industry.

severe. In an economic blizzard the blast of domestic retrenchment falls first on articles of luxury.

World demand since 1930.

11. Since this catastrophic fall in the world demand for silk, consumption has not yet responded to the stimulus of the phenomenal fall in prices. Towards the end of 1930, the price of raw silk as reported by Messrs. Morel-Journal and Company of Lyons was 40 per cent. lower than at the beginning of that year and only one-seventh of its record value in 1920. About this time the tael exchange also began to decline, depressing the market still further; and a Government syndicate was formed in February 1930 to hold up the Japanese stocks which were accumulating. It was expected that the new style of longer skirts in Europe would increase consumption; but they made no visible impression on prices, and any effect which they may have had upon the demand was more than neutralised by rainy weather and by the increasing use of artificial silk. It is reported that at this time 50 per cent. of the European looms were using artificial silk. Meanwhile as the depression deepened tariffs went up everywhere. In Shanghai the price of cocoons being higher than that justified by the price of raw silk, one-half of the filatures ceased to work. The stream of Chinese silk exports, dammed up in America by the fall in purchasing power there, began to flow towards India.

World demand in 1931.

12. The year 1931 did not record any improvement in demand and silk prices fell proportionately more than those for cotton and wool. They were at the end of the year half of what they were at the beginning of 1930 and one-tenth of the record prices obtained in 1920. Artificial silk, inspite of its well-known defects of quality, suited people's straitened purses better. Hoover's moratorium in April and a rising Chinese exchange provided a stimulus up to September 1931; but the demand fell off again and prices gave way when England went off the gold standard. In Shanghai most filatures were closed and silk instead of being exported was mortgaged with banks. Local weaving was stimulated in South China and the Levant and the inhabitants instead of exporting began to wear the silk which they had produced. It was increasingly felt that the depression had come to stay and attempts were made to adjust production to demand so as to establish some sort of equilibrium between them. The 1931 silk crop was 18 per cent. below the level of that of 1930. The rise of the price of Indian silk which took place at this time did not reflect any real improvement in demand, but was purely nominal, being due to the linking of the rupee to sterling and its consequent depreciation in terms of Chinese currency.

Production and demand in 1932.

13. In 1932 there were some signs of the disease working out its own remedy. As a result of the serious fall of prices of silk in the preceding years, production was curtailed in some countries, notably in China and Italy, and there was some improvement of demand in the large centres of consumption. Real silk stockings in England

having become cheap began to compete with those made of rayon, but in the United States of America on the whole there was a tendency to buy the cheapest article on account of reduced purchasing power. The total world output of silk was smaller than in either of the two previous years. In Shanghai the production of raw silk fell to below one-third of the 1930 level. Japan however kept up her production at nearly the same level as in 1931 and actually increased it above the 1930 level. She has further increased the world output of silk manufactures by using more of her own raw silk at home and placing larger and cheaper supplies of her silk goods on the world market. Having gone off the gold standard in December 1931 she has been able to cut out her competitors with the help of a depreciated exchange. The Chinese, having lost a great share of their American market to Japan, have been compelled to direct more and more attention to unprotected markets like India. In order to understand how this came to pass, we shall describe in Chapter II the history and present position of the sericultural industry in India.

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CHAPTER II.

The Sericultural Industry in India.

Introduction of sericulture in India.

14. There is a theory based on some Sanskrit texts and on the fact that the Indian word *put*, meaning silk, bears no resemblance to foreign equivalents in other languages which have been derived from the Tarter *ser* or the Chinese *tsi*, that the mulberry silkworm is indigenous to India. There are allusions to some sort of a silk in the *Rig Veda* and the *Ramayana* and *Mahabharata* epics; but it is not certain that they do not refer to *tasar* or another of the wild silks described in Chapter III, which have been found in India since time immemorial. It is more probable that the mulberry silkworm came to India from China. A study of the racial characteristics of the prevalent Indian varieties suggests that they entered the country from the North-East rather than from the North-West, though some references in the *Periplus* to a trade in silk from beyond Bactria *viâ* the Indus to the port of Barygaza (modern Broach) would support a North-Western origin. Possibly both routes were followed. It is however interesting to note that there is a theory in South China that its multivoltine worms came from South Asia somewhere near India.

Development of sericulture in India.

15. References to the mulberry silkworm as the Indian worm in early classical, Christian and Arab writings would seem to indicate that it had been firmly established in India somewhere near the beginning of the Christian era. It must have spread all over the Assam-Bengal plain and in Kashmir, two of the three principal areas where it is successfully reared at the present day. The third area—the plateau of Mysore, including the adjoining Kollegal taluk in the Coimbatore district of the Madras Presidency,—seems to have imported its silkworm from Bengal. Tradition attributes the introduction of sericulture into Mysore to Sultan Tipu, who is said to have imported the worm, according to one version from China, according to another from Bengal. The latter version seems the more probable, as there is an account of his having sent a native of Trichinopoly to Bengal " to learn the silk trade ". It is however probable that the industry existed in Mysore before Tipu's time, and that his connection with it consisted in trying to improve it; for there are references to silkworm rearing having been practised under Tipu's father, Hyder Ali. Attempts have been made from time to time to extend sericulture from these three centres into the adjoining tracts of the Madras and Bombay presidencies, Bihar and Orissa and the Punjab; but the industry has not yet become firmly established in these tracts and still remains confined in the main to the original areas. Within their limits, the industry has contracted and expanded with the fall and rise in the price of raw silk as

compared with the prices of other commodities. The industry received an extraordinary stimulus from the efforts of the East India Company to find a market for Indian silk in Europe in the latter half of the eighteenth century. It however received a set-back in the early part of the nineteenth century owing to the success of France and Italy in acclimatising the silkworm within their borders and again towards the end of the last century through the increased competition from China and Japan. At present the industry is almost dependent on its home market which also is seriously threatened by competition from abroad. The rearing of mulberry silkworms is now mainly confined to the Bangalore, Mysore, Tumkur and Kolar districts of the Mysore State, the Kollegal taluk of the Coimbatore district of the Madras Presidency, the Kashmir and Jammu State and the Malda, Murshidabad, Rajshahi and Birbhum districts of Bengal and a few scattered areas in Assam, Burma and submontane Punjab. We cannot speak with any authority about Burma since we received no reply to any of the communications addressed by us to the Burma Government.

Expansion under the East India Company.

16. It will throw some light on the present position of the industry, if we trace the history of its decline in some detail. When the Europeans came on the scene, they found a growing raw silk industry in Bengal and a flourishing silk manufacturing industry in all the principal Moghul governmental centres, chiefly at the ports of Surat and Masulipatam which did a large export trade in them. The English East India Company, after attempting the mistaken policy of setting up silk trading centres at Surat and Masulipatam and a filature at Patna, far away from Bengal from which the raw material was supplied, ultimately opened a centre at Kassimbazar in the Murshidabad district of Bengal where its silk export trade was organised with characteristic efficiency. The Dutch had already preceded them there, and were, according to Tavernier, exporting 6,000 to 7,000 bales of both raw and manufactured silk out of a total supply of 22,000 from that single centre alone.

Improvements in reeling Bengal silk effected by the Company.

17. The silk reeled in India was found to be uneven and full of defects when compared with the Turkish, Italian and Chinese silks which competed in the European markets. After 1757 when the Company acquired political control over Bengal, it resolved to develop the silk trade more intensively as a convenient means of "bringing home their revenues." In order to improve the market value of the silk it sent out a series of European silk experts, beginning with Mr. Richard Wilder, to improve the reeling process. Reductions of land revenue were made on lands under mulberry and, to disarm the opposition of Spitalfields silk weavers to its imports of Bengal silk manufactures, silk reeling was encouraged at the expense of silk weaving by means which caused considerable hardship. Italian and French methods of reeling, specially the croisure or the crossing of threads on the same reel, were successfully introduced by Mr. Wiss and his Italian and

French assistants; but, results having failed to come up to expectations, it was sought to replace the Bengal worms by Italian and Chinese races and the local bush mulberry by the Chinese and the Italian standard (tree) varieties. The introduction of Chinese mulberry and worms did not however meet with much success. Failure was attributed to native apathy or carelessness; but probably the new varieties were not suited to the climatic conditions of Bengal. The Company had already set up its own filatures, and in 1832 an experimental filature was set up at Howrah by the Board of Trade in order to guide the technical operations of the Company's residents in the silk districts.

Increase in the export trade.

18. The response of the industry to this stimulus is reflected in Table II of Bengal silk exports. The new mode of reeling having been established by 1775 the average imports of Bengal silk into England increased from 187,494 'small pounds' between 1772-1775 to 500,000 'small pounds' between 1776-1785 or nearly twice the imports from Italy and Turkey. In fact the Bengal silk drove all competitors except Italian and Chinese silks out of the English market.

TABLE II.

Imports of Bengal silk into England from 1793 to 1808.

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Year.	Company's Bengal raw silk imported.	Private Bengal raw silk imported warehoused by Company.	Total.
	lbs.	lbs.	lbs.
1793 . . .	677,988	91,885	769,873
1794 . . .	494,487	—	494,487
1795 . . .	379,543	12,984	392,527
1796 . . .	340,060	21,046	361,106
1797 . . .	88,219	—	88,219
1798 . . .	352,780	—	352,780
1799 . . .	643,803	1,618	645,421
1800 . . .	454,600	—	454,600
1801 . . .	310,368	—	310,368
1802 . . .	78,950	35,794	114,744
1803 . . .	336,189	68,904	405,093
1804 . . .	415,917	205,793	621,710
1805 . . .	460,303	375,601	835,904
1806 . . .	235,215	173,308	408,523
1807 . . .	225,984	267,601	493,585
1808 . . .	325,243	53,225	378,498

Other effects of the Company's policy.

19. It would appear that beyond the increased profits of mulberry cultivation and perhaps a slight increase of wages to reelers working in the Company's filature the increased exports did not greatly benefit the people of Bengal. The reeling processes were no doubt improved, but the effect on mulberry cultivation and cocoon production was, as noted by Mr. Atkinson, the Commercial Resident at Jangipur in Murshidabad district, on the whole unfortunate. Quality was sacrificed to quantity. The Company having almost a monopoly of the trade was in a position to fix in advance the price at which it was prepared to buy cocoons and once this was known there was every temptation to the rearers to underfeed their worms and to the cultivators to go in for coarser cuttings of leaves. It is possible that under this unhealthy stimulus the Bengal worm and the mulberry plant degenerated. The Company's remedy for this difficulty was worse than the disease. In order to render itself entirely independent of private rearers it contemplated starting government mulberry plantations and rearing houses on a large scale, and failing these sought to introduce foreign races of worms and mulberry trees without any previous research or sufficient examination whether the foreign races would suit their new environment and the habits of the rearers. The impression was common in Bengal and Mysore in the latter half of the nineteenth century that the *pebrine* disease previously unknown in India was introduced as a result of these and later similar experiments. Mr. G. N. Mukherjee, who popularised disease-free seed in Bengal, supports this view of a foreign origin of *pebrine*.

End of the Company's export trade.

20. The Company's monopoly of private trade was abolished in 1813 and its trading activities in 1833, and it wound up its silk business about 1836 leaving the whole trade to private enterprise. As long as the Company continued in business it made unceasing efforts by all available means to increase silk production in the other parts of its dominions including the Bombay and Madras presidencies. But it did not succeed in these efforts. The industry however was developed on the Mysore plateau where it flourished more on account of the operation of natural and economic circumstances than by any artificial aid of the Maharaja's government. Mysore silk did not enter to any appreciable extent in foreign trade but mainly satisfied the home demand of South Indian weavers. The reasons for the Company's insistence on encouraging the production of silk were the convenience which it offered in meeting its home charges, and the high prices which ruled in England from 1808 to 1813 on account of foreign supplies having been cut off by Napoleon's continental blockade. After the Napoleonic war it was discovered that the Bengal silk had a new formidable competitor in the silk of France and Italy, where sericulture had by this time been successfully acclimatised on a large scale. From that time onwards the price of Bengal silk declined but the Company continued to export it in large quantities even at some loss in certain years. Therefore the figures of total exports do not indi-

cate the true state of the industry. Private exports are a more reliable index and it will be noticed from Table III that in 1835 they fell as low as 6,026 lbs.

TABLE III.

Raw Silk imported into England from Bengal.

Year.	Company's Bengal raw silk imported.	Private Bengal raw silk imported warehoused by the Company.	Total Company's import and private import warehoused by the Company.
	lbs.	lbs.	lbs.
1812	558,862	423,565	982,427
1813	831,891	252,459	1,084,350
1814	722,727	114,239	836,966
1815	522,810	279,476	802,286
1816	381,215	398,549	779,764
1817	373,459	128,876	502,335
1818	758,116	420,860	1,160,976
1819	553,105	197,922	751,027
1820	811,875	289,572	1,071,447
1821	817,625	172,838	990,463
1822	845,382	197,235	1,042,617
1823	850,668	310,518	1,161,186
1824	660,012	271,637	931,649
1825	699,230	220,206	919,436
1826	898,388	338,635	1,237,023
1827	926,678	99,361	1,026,039
1828	1,039,623	96,686	1,136,309
1829	1,129,710	258,044	1,387,754
1830	1,096,071	90,092	1,186,163
1831	1,030,280	64,597	1,094,877
1832	750,828	205,625	956,453
1833	698,851	52,129	750,980
1834	757,517	53,124	810,641
1835	721,509	6,026	727,535

State of the Bengal industry in 1832.

21. It is convenient to describe the organisation of the industry in 1832 when the trade was thrown open to the public and the total export began to decline. The Company had eleven head 'factories' in the silk producing districts under commercial residents whose duty it was to provide silk for the Company's investment, by reeling silk in the Company's filatures (12,039 basins) and other hired filatures (3,684 basins). The cocoons were bought through middlemen called *pykars* to whom advances were made. Mulberry cultivation was generally carried on separately from silkworm rearing, a system which to some extent survives in Bengal up to the present day. Filature silk was more even, had a proper croisure and being reeled under supervision was alone suitable for export but

some country reeled silk called *Khungru* silk was also bought and exported to make up the deficiencies in the investment. The reeling machines used in the Company's filatures were based on the best European models of the time and such must have been the case in the private filatures run by Europeans who continued the business after the Company retired from it. Their example must have influenced Indian practice because it is recorded that " many natives reeled silk in the same way as the Company ". It is unfortunate that reeling practice in Bengal whether European or Indian never kept pace with subsequent developments in France and Italy and has remained up to the present day what it was in 1835.

Decline of the industry after 1835.

22. After the exit of the Company, the State took no further steps to assist or improve the industry though foreign competition from China on account of the opening of the Treaty Ports after the Opium War of 1842 became more acute. An opportunity came between 1865 and 1872 when the great outbreak of *pebrine* disease laid the European industry low; but the Indian industry had fallen into such serious neglect that it was not prepared to take advantage of it. A Silk Supply Association was formed in England to develop Empire sources of supply specially the traditional Indian sources, and an official enquiry was conducted by Mr. Geoghegan, Under Secretary to the Government of India, Department of Agriculture, Revenue and Commerce, into the history and the present position of the industry; but nothing more was done and the gap in the European supply was filled by Japan with her characteristic energy. By suitable organisation and by adopting the latest improvements she has maintained and improved the lead she thus secured until she has become the largest producer of raw silk in the whole world. The only result of this international crisis seems to have been a temporary rise in the price of Indian silk from 1865 to 1872 and an equally temporary stimulation of the Kashmir silk industry. Tables IV, V and VI illustrate the exports of Bengal silk from 1838 to 1871, the course of its prices from 1855-56 to 1914-15 and the rise of Japan at the expense of Bengal in the world production or export trade.

TABLE IV.

Bengal Silk Exports from 1838 to 1871.

Period.	Average exports lbs.
1838-39 to 1841-42	1,384,242
1842-43 to 1845-46	1,555,130
1846-47 to 1850-51	1,290,024
1851-52 to 1855-56	1,511,506
1856-57 to 1860-61	1,511,768
1861-62 to 1865-66	1,485,763
1866-67 to 1870-71	1,558,246

TABLE V.

Average prices per seer of Bengal raw silk.

Season.	Price. Rs.	A.	P.		Season.	Price. Rs.	A.	P.
1855-56	22	15	0		1870-71	20	12	10
1856-57	20	4	11		1871-72	23	10	7
1857-58	19	8	9		1872-73	18	2	8
1858-59	21	1	9		1873-74	15	9	4
1859-60	20	13	0		1874-75	12	8	4
1860-61	18	1	11		1875-76	16	4	4
1861-62	18	15	11		1876-77	20	2	3
1862-63	18	3	9		1877-78	14	8	9
1863-64	16	9	8		1878-79	16	1	0
1864-65	21	0	9		1879-80	17	8	8
1865-66	24	0	4	Pebrine period.	1880-81	17	6	0
1866-67	23	6	2		1881-82	16	15	10
1867-68	24	14	7		1882-83	15	10	6
1868-69	23	6	2		1883-84	13	12	7
1869-70	23	8	6		1884-85	12	11	5
					1885-86	17	6	9

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Season.	Price. Rs.	A.	P.	Season.	Price. Rs.	A.	P.
1900-01	14	3	6	1908-09	12	9	8
1901-02	14	8	0	1909-10	13	1	9
1902-03	15	14	10	1910-11	14	2	8
1903-04	15	0	8	1911-12	14	12	2
1904-05	15	11	4	1912-13	15	1	8
1905-06	17	3	11	1913-14	17	6	1
1906-07	18	8	7	1914-15	13	6	2
1907-03	14	2	7				

Table VI.

The supply of silk available for European consumption in bales of 100 lbs.

—	1854-55.	1875-76.	1876-77.	1877-78.	1878-79.	1879-80.	1880-81.	1881-82.	1882-83.	1883-84.	1884-85.	1885-86 estimates.	
												Maximum.	Minimum.
Italy	92,400	57,100	25,000	40,500	62,500	32,000	68,500	70,000	52,000	73,000	65,000	45,000	40,000
France . . .	44,000	16,000	2,000	19,000	13,500	8,500	9,500	9,500	17,500	14,500	10,000	10,000	8,000
Spain . . .	3,300	2,500	1,500	750	1,100	800	1,500	1,500	2,300	1,750	1,500	500	500
Greece and Asia Minor	6,600	16,000	10,000	6,000	6,000	5,000	5,000	5,000	6,000	12,000	12,000	10,000	8,000
Total Bales .	146,300	91,600	38,500	66,250	83,100	46,300	84,500	86,000	77,800	101,250	88,500	65,500	56,500
China . . .	55,000	68,000	65,000	46,000	53,000	55,000	67,000	44,000	47,000	50,000	50,000	45,000	42,000
Canton . . .	19,800	14,000	10,000	12,500	9,000	12,500	5,000	14,500	11,500	16,000	7,000	12,000	12,000
Bengal . . .	11,000	8,492	6,000	5,000	6,000	5,000	4,000	3,000	3,000	3,000	2,000	2,000	2,000
Japan . . .	..	14,000	13,000	22,000	22,000	14,000	15,000	15,500	25,000	25,000	20,000	15,000	12,000
Total Bales .	85,800	104,492	94,000	85,500	90,000	86,500	91,000	77,000	86,500	94,000	80,000	74,000	68,000
GRAND TOTAL BALES	232,100	195,992	132,500	151,750	173,100	132,800	175,500	163,000	164,300	195,250	168,500	139,500	124,500
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*
Price of Tsatlee No. 4 .	15 0	15 0	28 0	16 6	15 0	15 3	13 9	17 0	14 6	16 0	13 0	12 6	12 6

Expanding market for silk waste.

23. The industry came to depend more and more on the home market, and that also was invaded by Chinese imports as Table VI, would show. The European filatures which only reeled for export began to close one by one. The only redeeming feature in the situation after 1857 was that Europe began to understand the use of waste silk which from then onwards was exported from India in large quantities. Indeed the price of silk waste thus obtained came to be regarded as the main source of profit by the country charkhas working for the domestic market. The Indian exports of "raw silk" in Table VII appear to be imposing betokening great prosperity for the industry, but they include silk waste and cocoons of all kinds of worms as well and therefore Table VIII giving also total values for the years 1889-90 to 1914-15 conveys a truer picture.

TABLE VII.

Imports and exports of raw silk by sea into and from British India.

Year.	Imports of foreign silk. lbs.	Re-exports of foreign silk. lbs.	Exports of Indian silk.* lbs.
1850-51 . .	1,259,974	Not available.	Not available.
1851-52 . .	1,045,220		
1852-53 . .	1,041,612		
1853-54 . .	1,340,690		
1854-55 . .	1,140,140		
1855-56 . .	1,392,219		1,148,841
1856-57 . .	564,878		1,756,778
1857-58 . .	1,438,630		1,580,463
1858-59 . .	1,847,643		1,217,438
1859-60 . .	1,149,492		1,670,698
1860-61 . .	1,478,863		1,955,656
1861-62 . .	...		1,101,844
1862-63 . .	1,601,366		1,228,684
1863-64 . .	1,404,925		1,369,556
1864-65 . .	1,276,773		1,582,341
1865-66 . .	1,451,822		1,445,153
1866-67 . .	1,491,687		2,145,354
1867-68 . .	1,627,996		2,226.201
1868-69 . .	1,959,951	58,932	2,405,005
1869-70 . .	2,019,974	226,249	2,368,452
1870-71 . .	2,328,854	148,760	2,131,399
1871-72 . .	1,799,591	94,545	1,893,545
1872-73 . .	1,930,910	142,361	2,231,578
1873-74 . .	2,282,758	168,313	2,223,917
1874-75 . .	2,469,255	74,754	1,656,015
1875-76 . .	2,457,244	106,744	1,310,569
1876-77 . .	1,461,069	100,597	1,417,893

Year.	Imports of foreign silk.	Re-exports of foreign silk.	Exports of Indian silk.
	lbs.	lbs.	lbs.
1877-78 . .	2,102,920	145,186	1,512,819
1878-79 . .	1,813,993	205,116	1,329,599
1879-80 . .	2,005,020	271,698	1,401,506
1880-81 . .	2,511,802	207,030	1,302,576
1881-82 . .	1,760,595	157,485	1,117,026
1882-83 . .	2,386,150	163,912	1,359,433
1883-84 . .	2,210,893	130,373	1,602,814
1884-85 . .	1,831,702	142,184	1,567,101
1885-86 . .	1,732,559	84,457	1,438,767
1886-87 . .	1,737,891	124,605	1,583,924
1887-88 . .	2,598,597	109,209	1,625,177
1888-89 . .	2,045,569	111,832	2,121,912
1889-90 . .	2,360,467	116,261	2,089,764
1890-91 . .	2,406,239	145,298	1,760,611
1891-92 . .	2,701,069	119,919	1,662,519
1892-93 . .	2,292,846	109,141	1,820,233
1893-94 . .	2,947,595	113,069	1,771,085
1894-95 . .	2,494,496	95,542	1,330,727
1895-96 . .	3,030,546	60,680	1,792,429
1896-97 . .	2,287,752	88,650	1,494,789
1897-98 . .	2,049,608	66,654	1,662,030
1898-99 . .	2,250,866	72,832	1,564,151
1899-00 . .	1,694,848	90,795	1,939,718
1900-01 . .	2,535,377	97,519	1,604,275
1901-02 . .	2,128,483	59,941	1,935,761
1902-03 . .	1,639,189	85,249	1,989,822
1903-04 . .	1,544,315	68,131	1,862,316
1904-05 . .	1,858,709	54,522	1,343,663
1905-06 . .	1,645,696	69,330	1,779,316
1906-07 . .	1,422,467	105,288	1,943,438
1907-08 . .	2,050,839	83,333	1,943,126
1908-09 . .	2,168,458	74,135	1,833,644
1909-10 . .	2,330,185	72,617	2,075,612
1910-11 . .	2,121,799	70,280	1,850,551
1911-12 . .	2,239,105	17,011	1,749,946
1912-13 . .	3,578,837	56,155	1,677,841
1913-14 . .	2,563,720	21,371	1,203,093
1914-15 . .	2,303,331	14,305	516,282

TABLE VIII.

Exports of Indian Raw Silk.

Year.	Reeled Silk.	Chassam (or silk waste).	Cocoons.	Total.	
				Quantity.	Value.
	lbs.	lbs.	lbs.	lbs.	Rs.
1889-90 . .	593,425	1,233,494	262,843	2,089,762	63,98,178
1890-91 . .	502,603	1,112,313	145,695	1,760,611	52,10,686
1891-92 . .	518,705	1,012,254	131,560	1,662,519	51,86,271
1892-93 . .	655,338	1,087,500	77,395	1,820,233	61,75,739
1893-94 . .	613,330	1,080,684	77,071	1,771,085	69,80,989
1894-95 . .	510,800	793,892	26,035	1,330,727	50,20,087
1895-96 . .	707,683	1,072,452	12,294	1,792,429	64,21,693
1896-97 . .	595,433	498,713	643	1,494,789	51,16,611
1897-98 . .	622,587	1,037,701	1,742	1,662,030	51,48,504
1898-99 . .	512,830	1,046,541	4,780	1,564,151	45,80,032
1899-00 . .	722,285	1,217,432	..	1,939,718	69,86,106
1900-01 . .	559,776	1,030,523	13,976	1,604,275	51,22,057
1901-02 . .	727,651	1,165,754	42,356	1,935,761	66,34,209
1902-03 . .	681,852	1,240,689	67,281	1,989,822	65,48,153
1903-04 . .	624,064	1,136,566	101,686	1,862,316	63,42,468
1904-05 . .	506,318	751,355	85,990	1,343,663	49,69,975
1905-06 . .	578,450	1,131,960	68,906	1,779,316	56,39,679
1906-07 . .	777,654	1,095,193	70,591	1,943,438	68,65,018
1907-08 . .	730,733	1,093,384	119,009	1,943,126	63,78,154
1908-09 . .	581,566	1,182,691	69,387	1,833,644	54,05,077
1909-10 . .	501,135	1,485,548	88,929	2,075,612	50,75,737
1910-11 . .	494,035	1,147,243	209,273	1,850,551	50,55,287
1911-12 . .	381,677	1,092,764	275,505	1,749,946	45,83,853
1912-13 . .	382,081	943,143	352,617	1,677,841	41,73,726
1913-14 . .	160,222	909,077	133,799	1,203,098	24,74,142
1914-15 . .	82,700	483,600		516,282	11,91,000

Disease as a factor in the decline of the Bengal industry.

24. Other causes besides competition from European and from the Far East which has been suggested as explaining the decline of the Bengal silk industry are disease, competing crops and occupations, high rents and the degeneration of the race of silkworms. *Pebrine* disease became a factor of importance in Bengal about 1875 and is now regarded in authoritative circles as mainly responsible for the continued decline of its industry. The same or some different disease seems to have attacked the indigenous Mysore and Kashmir silkworms about the same time. The Kashmir industry was completely destroyed and the Mysore industry just escaped destruction. They were revived only as late as 1895 and 1915, respectively. It has been argued that on account of the low prices resulting from Japanese competition the rearers were driven to starve their worms and thus make them more liable to develop disease or catch infection.

Competing crops and occupations.

25. Competing crops and occupations have undoubtedly had much to do with the decline of Bengal sericulture. It was noticed that before the present depression jute and rice rose more in price than Bengal silk, and therefore where land was suitable for growing these crops mulberry cultivation gave way. According to Mr. Maxwell Lefroy there is indisputable evidence that sericulture declined in the district of Bogra, because of the greater profits obtained from jute. It has been said that one reason why the industry still survives in the districts of Malda and Murshidabad is that the level of mulberry lands having been raised by repeated manuring with tank silt they cannot be made suitable for jute and rice cultivation without incurring very great expense. Even in these districts potatoes, vegetables and mangoes are possible substitutes. The same results may be expected if there is a disproportionate rise in agricultural and industrial wages in the neighbouring areas such as has occurred in the jute mills, the coalfields and the tea gardens.

Other possible causes of the decline.

26. A good deal of controversy has raged on the point whether the Bengal silkworm has degenerated. We have received no proof that it has. We have received complaints regarding the rents charged by Bengal zemindars for land cultivated with mulberry. We have ascertained that though the rent has fallen in recent years, it is still as high as Rs. 15 per acre against Rs. 3 to Rs. 4 for rice lands and Re. 1 and Rs. 1-12 in the shape of land revenue in Madras and Mysore, respectively.

Rise of the Kashmir industry.

27. We have dwelt at length on the decline of the Bengal silk industry and its causes to show the position India once occupied in the world production of silk and illustrate the possibilities, we believe, it has in the future if the lesson of the past is thoroughly learnt and the factors making for the decline are removed. That this is not a large assumption is illustrated by the rise of the

Kashmir and Mysore industries in the twentieth century as the Bengal industry declined. The growth of Kashmir production and its increasing share in the export trade are illustrated in Table IX. Kashmir exports to Europe became important when the new modern filatures set up by Government started working after 1905. The Bombay and Sind figures in Table X roughly represent Kashmir exports. The Madras figures represent mostly silk waste exported from Mysore and Kollegal.

TABLE IX.

Table showing (a) *the number of rearers,* (b) *the quantity of seed issued and* (c) *the production of raw silk, in Kashmir from 1906-07 to 1915-16.*

Year.	Number of rearers employed.	Seed issued.	Maundage of cocoons.	Produce per oz. of seed yield.	Raw silk produced.	Waste silk produced.
		oz.	mds.	lbs.	lbs.	lbs.
1906-07 . .	14,427	27,544	21,409	63½	115,748	74,989
1907-08 . .	17,433	28,221	28,421	82	132,760	98,179
1908-09 . .	18.949	27,954	23,490	68	129,045	71,461
1909-10 . .	26,234	32,060	36,428	92	184,221	95,902
1910-11 . .	35,034	34,156	40,407	98	168,167	97,606
1911-12 . .	41,532	34,251	37,565	88	215,749	125,244
1912-13 . .	46,363	36,006½	37,487	85	181,056	129,969
1913-14 . .	47,501	36,735½	37,921½	85	94,978	73,850
1914-15 . .	48,936	36,738½	33,672½	74½	53,597	24,727
1915-16 . .	51,076	37,610	33,862	73½	96,879	73,042

TABLE X.

Exports of Reeled Silk and Chassam (or Silk Waste) from Bengal, Bombay and Sind, and Madras.

	Bengal.				Bombay and Sind.				Madras.	
	Reeled Silk.		Chassam.		Reeled Silk.		Chassam.		(Mysore Chassam).	
	lbs.	Rs.	lbs.	Rs.	lbs.	Rs.	lbs.	Rs.	lbs.	Rs.
1899-00	722,199	61,49,598	869,165	6,25,895	87	300	56,204	34,532	277,260	1,65,851
1900-01	588,237	42,95,081	672,034	5,67,434	1,539	7,626	8,652	9,300	362,564	2,41,865
1901-02	678,871	52,96,240	775,890	6,08,424	48,780	4,56,980	20,955	30,266	375,738	2,13,654
1902-03	697,597	46,33,078	709,590	5,30,157	84,255	8,91,740	83,805	1,01,251	463,822	3,51,631
1903-04	506,842	40,36,499	663,764	5,94,103	116,262	12,08,450	52,279	78,889	432,767	3,36,147
1904-05	408,376	31,74,131	427,319	3,96,061	97,942	10,75,050	43,536	68,512	295,378	1,85,864
1905-06	486,064	37,30,582	605,464	4,84,695	92,386	10,02,250	63,446	1,03,268	485,600	2,72,913
1906-07	634,982	50,13,224	640,843	4,69,226	135,922	9,22,127	71,509	1,73,056	392,695	2,18,532
1907-08	512,142	41,33,559	664,263	4,90,558	218,591	13,33,651	61,794	77,426	377,778	2,31,013
1908-09	453,128	34,05,528	532,350	3,66,193	128,438	11,65,570	78,819	1,19,952	571,840	2,79,439
1909-10	319,702	23,01,090	762,315	4,25,295	181,433	16,80,105	168,742	3,25,060	559,550	3,58,434
1910-11	327,947	23,12,605	578,645	3,81,863	166,088	17,16,200	221,137	2,63,270	360,481	2,29,703
1911-12	190,437	14,04,051	501,669	3,41,065	191,240	19,11,000	205,280	3,87,210	400,981	2,35,752
1912-13	102,587	7,78,708	426,573	3,29,079	279,494	23,10,975	193,073	1,71,700	301,978	1,85,740
1913-14	52,961	4,65,055	444,680	3,63,813	107,261	10,63,485	183,788	2,14,625	271,898	1,91,456
1914-15	28,905	2,69,560	182,165	1,32,115	53,467	5,28,205	74,637	92,551	71,719	53,075

Continued decline in the world market.

28. In spite, however, of this Kashmir reinforcement, the Indian industry as a whole continued to lose ground in the world market as seen from the following Table. The European demand for Bengal silk which was prized for its lustre, if not for its weaving qualities and was therefore largely used in making velvet and silk hats, declined according to the Industrial Commission's Report as these articles went gradually out of fashion. There is, however, some evidence that the industry was compensated to some extent for the loss of its exports by an expansion of the home market on account of the prosperity enjoyed by India at the beginning of the nineteenth century brought about by the general rise in agricultural prices.

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TABLE XI.

Production of raw silk in 1,000's of kilos.

	——	1909.	1910.	1911.	1912.	1913.	1914.	1915.
I	France	674	318	402	505	350	405	130
	Italy	4,251	3,947	3,490	4,105	3,540	4,060	2,878
	Spain	82	83	88	78	82	73	50
	Austria-Hungary . .	378	352	350	294	273	302	167
II	Turkey-Anatolia . .	665	480	585	383	465	345	175
	,, Syria and Cyprus .	445	540	525	400	490	430	350
	,, Rest . . .	125	130	160	115	135	110	65
	,, European* . .	380	360	375	260	85	60	30
	Balkans	223	175	170	145	135	175	100
	Greece and Crete* . .	60	57	62	50	185	140	80
	Caucasus	540	520	480	395	385	360	125
	Turkestan† . . .	340	293	303	258	225	85	50
	Persia†	260	245	300	227	210	80	40
III	Shanghai† . . .	5,185	5,193	5,940	6,440	5,765	4,135	5,540
	Canton†	2,295	2,637	1,730	1,160	2,750	1,920	1,960
	Japan†	8,372	8,935	9,370	10,867	12,120	9,490	11,250
	India (Bengal and Kashmir)†	235	230	224	168	113	34	81
	Indo-China† . . .	..	..	16	15	12	16	14
	TOTAL .	24,510	24,495	24,570	26,965	27,320	22,220	23,385

The war boom and after.

29. We have now come to a point where we can speak of the sericultural industry of India as a whole. During the war, owing to the increased demand for silk for military purposes the price of silk rose and all the silk areas in India shared in this prosperity. But they did so in unequal degrees. Kashmir which had established a complete government monopoly from the cultivation of mulberry to the marketing of raw silk, and had minimised the chance of disease by using pure imported seed and had completely modernised its reeling process, was naturally the best prepared to take the fullest advantage of the rise. The large profits of monopoly amounting to more than Rs. 11 lakhs a year proved to be a welcome addition to the revenues of the State. Both Bengal and Mysore were caught unprepared but Mysore showed great energy in effecting necessary improvements in order to take a fuller advantage of the new opportunity. Its industry had almost died out in 1866 as a result of disease. It was revived in 1890 but again

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* Salonika transferred from Turkey to Greece in 1913.
† Export not production.

declined and reached its lowest point in 1914-15 with 25,000 acres under mulberry when the war broke out. Its sericultural department was organised on a permanent basis in 1920 though some preliminary spade work had already been done. At the same time the Government of India brought out the Imperial Silk Specialist—Mr. Maxwell-Lefroy—to undertake a comprehensive all-India enquiry into the possibilities of reviving the industry in its old centres and developing it in new areas. He submitted a valuable report in the year 1916 on which no action seems yet to have been taken. The boom conditions continued after the war until 1920 when record maximum prices were realised at Lyons. Then a reaction set in as a result of the general fall of prices throughout the world. The effect of this reaction was disguised in India for some time on account of the low rupee exchange which prevailed at that time, when the rupee fell from 2 shillings gold to about 1/3*d.* sterling. Peak prices were therefore obtained in India as late as 1922 as is evident from the following Table giving the list of prices of European filature silk in Calcutta.

TABLE XII.

Price of European filature silk per factory seer in Calcutta.

Year.	Rs.	A.	P.	Year.	Rs.	A.	P.
1873	21	7	8	1921	29	1	0
1911	14	14	11	1922	36	2	1
1912	15	14	6	1923	34	7	8
1913	16	2	0	1924	29	15	4
1914	16	12	3	1925	22	1	4
1915	14	7	8	1926	22	0	10
1916	17	6	3	1927	20	12	9
1917	22	5	5	1928	20	7	4*
1918	26	8	6	1929	17	13	7*
1919	24	10	1	1930	14	6	8*
1920	29	0	1				

Thereafter the rupee exchange appreciated in terms of gold to 1/6*d.* where it was stabilised in 1927, while the Shanghai tael depreciated, as Table XIII shows, giving a distinct advantage to Chinese silk in competing with Indian silk.

TABLE XIII.

Rupees for 100 Shanghai taels.

December—		December—	
1921	280	1927	176
1922	235	1928	176
1923	237	1929	151—145
1924	224—211	1930	107—97
1925	210	1931	124—134
1926	168	1932	117

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* Quotation for filature silk 12—16 denier, Malda.

Invasion of the home market.

30. As a result of these circumstances the export of Indian raw silk whether in the form of reeled silk or silk waste and cocoons has practically ceased. This has specially affected the filatures existing in India as they depend for their custom largely on the foreign market, since there is not much demand in India for the high grade silk at the price at which they can produce it. The charkha reeling industry catering exclusively for the home market, besides suffering from the fall of price has also been hit hard by the loss of its only market for silk waste which used to provide the major portion of its profit. The circumstances in which the world demand for silk fell after the Wall Street crisis in 1929 and China turned increasing attention to India have already been described in the preceding Chapter. Before this China used to export her best silk to Europe and America, and her exports to India consisted mostly of coarse hand reeled products which were used for hand sewing or for borders and ' palavs ' or ' anchals ' of the cheap class of saris. Since 1915 medium qualities which compete more seriously with the hand reeled products have been coming in increasing quantities. Owing to the failure of the American demand unusually large quantities of this silk including high grade steam filature silk were exported to India at uneconomic prices with which Indian hand reeled products could not possibly compete, and a grave crisis was created for the indigenous industry. The following figures of Shanghai and Canton exports speak for themselves :—

TABLE XIV.

Shipment of Chinese raw silk in bales of 133 lbs.

—	Canton.				Shanghai.			
	1929-30.	1930-31.	1931-32.	1932-33. (May—Oct. 6 months only).	1929-30.	1930-31.	1931-32.	1932-33. (May—Oct. 6 months only).
America . .	38,582	43,868	20,218	8,920	47,538	37,002	13,402	5,514
Europe . .	19,152	20,424	6,680	3,301	36,928	30,778	11,254	7,972
India and others .	887	4,619	5,373	10,534	22,694	10,972	11,060	7,616

It is on record in the American Silk Digest Weekly and our information has been corroborated by the Chinese Vice-Consul at Bombay that the price of silk mortgaged with Chinese banks fell below the amounts advanced. We further understand from the

Chinese Vice-Consul that the banks in the silk provinces of Chekiang and Kiangsu, on the refusal of their customers to redeem their mortgages, were relieved of their embarrassment by a Government bounty of 100 taels per bale of 100 kin (132·3 lbs.) of silk so mortgaged. Before this the export duty on all Chinese silk of 17½ Canton dollars per picul of 133 lbs. had been abolished. The Silk Digest Weekly reported that in May and June 1932 out of the total of 3,500 bales sold in Canton in those months as many as 2,900 bales were sold to India. This explains the large imports of Chinese silk into India in the latter part of the last year. It would appear from the above figures that thanks to its unprotected condition India imported in 1932-33 more Chinese silk than either Europe or America.

Other encroachments on the home market.

31. The unprecedented situation so created by these imports has been further complicated by greater internal competition. Kashmir silk deprived of its accustomed European market is trying to find a larger outlet in India at uneconomic prices. Besides these direct encroachments on the home market, there are indirect factors which have reduced its size. The large increase since Japan went off the gold standard of imports of silk, artificial silk and mixed goods, which seriously compete with the products of silk handlooms has lowered the capacity of weavers to buy the comparatively expensive Indian natural silk, and has compelled them to use more and more of cheap foreign substitutes including spun silk and artificial silk yarn. The depression in the weaving industry has contracted the weaver's total demand for yarn and has had the effect of reducing the demand for raw silk in India and the general diminution of purchasing power has acted in the same direction. Assailed thus on all sides only a complete reorganisation including a thorough overhauling of its cost of production can save this ancient Indian industry from extinction.

Present extent of the industry.

32. In its present attenuated form the mulberry silkworm industry is mainly confined to four districts in Mysore, four districts in Bengal, one taluk in Madras and certain tracts in Kashmir and Jammu State and a few villages in Assam and the Punjab. Besides, the *tasar* silkworm is reared in the forest areas of Bihar and Orissa, the Central Provinces and the Mirzapur district in the United Provinces, the *muga* worm in Assam and the *eri* silkworm in Bengal and Assam and a few places in Bihar and Orissa and Madras. No reliable statistics of production are available except in Kashmir where the industry is a State monopoly. In Mysore, Bengal and Madras production is deduced from equally unreliable figures of acreage of mulberry cultivation. In Mysore these figures are checked to some extent by figures of railborne traffic and the observations of the officers of the sericultural department which is more thoroughly equipped than in any part of British India. Units of weight and measurement not only vary from province to province, from place to place in the same area, but from one branch of the industry to another. With these limitations on our means of knowledge, we

estimate the extent of the industry and the number of people dependent upon it as follows:—

TABLE XV.

Statistics of Silk Production (in Round Figures) 1931-32.

Name of Area.	Production of cocoons. lbs.	Value of cocoons. Rs.	Silk reeled. lbs.	Value of Silk. Rs.	Silk Waste. lbs.	Value of silk waste. Rs.
Mulberry Silk.						
1. Bengal . . .	14,500,000	36,50,000	1,000,000	50,00,000	500,000	1,25,000
2. Mysore . . .	9,620,000	30,00,000	740,000	41,62,500	376,000	92,000
3. Kashmir . . .	2,016,000	6,75,000	200,000	13,75,000	98,000	62,500
4. Jammu . . .	640,000	2,25,000	32,000	2,20,000	15,000	11,250
5. Madras . . .	1,260,000	4,20,000	90,000	4,50,000	45,000	8,000
6. Assam . . .	102,400	16,000	6,400	36,000	..	..
7. Punjab . . .	16,000	4,000	1,000	5,280	750	200
Total Mulberry silk production.	28,154,400	79,90,000	2,069,400*	1,12,48,780	1,034,750	2,98,950
Tasar Silk.						
1. Bihar and Orissa .	..	..	240,000†	31,62,000†	No information.	
2. Central Provinces .	250,000	6,25,000	160,000*	14,00,000	160,000	22,000
3. United Provinces .	1,000	1,050	1,000	No information.		
Total known *tasar* silk production.	..	..	401,000	45,62,000		
Other Silk.						
1. Assam *Muga* . .	..	..	100,000	10,00,000	No information.	
2. Assam *Eri* . .	..	..	50,000§	1,00,000		
Total wild silk production	..	..	551,000	56,62,000		
GRAND TOTAL .	..	..	2,620,400‡	1,69,10,780		

* Total imports of Bengal reeled silk in England in 1829 were 1,387,754 pounds.
† Average provincial export in 1921.
‡ Total Indian exports (including other silks and silk waste) in—
1868-69 were 2,405,005 lbs.
1909-10 were 2,075,612 lbs. : without waste 501,135 lbs.
Spun Silk.

TABLE XVI.

Production Statistics 1931-32 in Round Figures.

Name of area.	Acreage exclusively under Mulberry.	Number of persons depending on silk worm rearing (mostly part time).	Number of country reeling machines of one basin each.	Number of power driven filatures.	Number of power driven filature basins.	Total number of basins.	Number of persons engaged in reeling and connected branches.
Mulberry Silk.							
1. Bengal . .	25,000	160,000	5,000	..	..	5,000	15,000
2. Mysore . .	37,000	240,000	4,000	2	58	4,058	12,152
3. Kashmir . .	..	124,000	..	4	992	992	2,250
4. Jammu . .	..	33,000	79	1	15	94	350
5. Madras . .	6,105	120,000	500	1	40	540	2,000
6. Assam . .	..	12,000	50	..	..	..	200
7. Punjab . .	..	1,900	6	..	..	6	25
Total for Mulberry silk.	68,105	690,900	9,635	8	1,105	10,690*	31,977
Tasar Silk.							
Bihar and Orissa .	..	160,000	..	..	No information. Mostly primitive hand appliances.		
Central Provinces .	..	30,000	..	..			
United Provinces .	..	1,200	..	..			
Total for *tasar* silk .	..	191,200	..	..			
Other silk.							
Assam *Muga* . Assam *Eri* .	..	150,000	..	..			
GRAND TOTAL .	..	1,032,100					

The Bengal Government on the basis of some old calculations of Mr. Maxwell-Lefroy claimed in its memorandum a production of 2,000,000 pounds of raw silk for Bengal—a figure which on oral examination was subsequently modified by its representatives to 1,500,000. We regard this estimate even with the later modification as excessive. Mr. Maxwell-Lefroy's basis of calculation of 15 maunds of cocoons and 75 pounds of silk per acre was based on the assumption that the worms are not diseased. We shall see later in Chapter VI that this assumption is never true in practice and that there is a loss by disease or careless rearing of at least 50 per cent. Assuming the yield of silk to be 37½ pounds per acre, the total yield for the present area under mulberry cultivation of 25,000 acres comes to 937,500 pounds or roughly 1,000,000 pounds. This estimate is borne out by the figure of 750,000 pounds arrived at in 1926-27 for the chief silk rearing areas in the important districts of Malda, Murshidabad and Birbhum. Since then production has diminished and we do not think the present production can in any circumstances be more than 1,000,000 pounds. In any case the Bengal Government's estimate is not supported by any of the other witnesses from Bengal. Mr. Maxwell-Lefroy himself estimated the Bengal production in 1917, as reported by the Industries Commission, at 600,000 pounds which we regard as an underestimate and equally improbable.

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* *N.B.*—Number of East India Company's filature and other basins in Bengal in 1833 was 15,723.

Smallness of the industry.

33. In the absence of regular production statistics the figures given except in the case of Kashmir are based on inferences and are at best rough approximations. They nevertheless indicate clearly in conjunction with Tables VI, VII and XI that the industry has declined absolutely as well as relatively. It is interesting to compare these detailed figures with those of Japan which has not more population or area than Bengal, Mysore and Kashmir put together or greater natural advantages than these centres. In 1925-26 Japan produced 71,000,000 pounds of raw silk of which 56,979,000 were exported constituting roughly 45 per cent. of her total exports. She had in the same year 3,000 power filatures of all sorts of sizes, varying from 50 basins to 1,000 basins, with a total of 300,000 basins worked by 336,000 persons, of whom 300,000 were girls. There were two million families, *i.e.*, about 8 million persons or 34 per cent. of all Japanese farmers engaged in raising silkworms, and ·88 per cent. of the entire farm area was taken up with mulberry cultivation.

Possible areas of expansion: Main defects of the Indian industry.

34. Similar figures of production could be obtained in India or even exceeded; for the present areas, if insufficient, are capable of extension and there are others declared quite suitable by Mr. Maxwell-Lefroy in 1916 such as the Himalayan submontane tract extending all the way from North Bihar to Kashmir, the Chota Nagpur plateau, the uplands of Orissa and Central India and the valleys of the North-Western Frontier and Baluchistan and the Western Ghats. But the main defect of the Indian industry is not want of natural resources but want of organisation and failure to change its methods. Mulberry is still largely cultivated and silkworms are reared in the old primitive fashion without any adequate research into the best yielding varieties. In some parts of the country disease levies a heavy toll on the worm population. Reeling is almost exclusively carried on with the most primitive appliances ranging from the Central Provinces *tikli* and the Assamese *hir*

which do not cost more than 8 annas, to the Mysore *charkha* and the Bengal *ghai*. The modern power driven filatures of Kashmir are the exception rather than the rule. There is nothing like marketing organisation in India. For these reasons the Indian industry must find it difficult to compete with French, Italian and Japanese methods, assisted as they are by State measures and scientific research.

Government responsibility for defects : vitality of the industry.

35. For many of the defects mentioned above, government neglect in the various areas has been largely responsible. The sericultural industry is a unique industry, differing from other industries in this sense that in its modern form it cannot stand without government organisation and assistance. *Pebrine* infection, a hereditary disease of the silkworm and the chief obstacle to economical production, cannot be controlled without government legislation, nor can the best and cheapest silk be produced without a central scientific research organisation, nor can it be marketed at the best price without being scientifically graded and tested in a conditioning house. It is difficult for these institutions to grow in a backward country like India without government assistance. Our long historical survey shows that the industry flourished in Bengal as long as the East India Company took an interest in it. Since 1835 the industry has alternately revived and declined with the fluctuations in the interest of Government. This has become keen at times of silk famines in Europe, as for instance in 1870 and 1915, when inquiries were ordered, and has subsided at times of plenty. If the industry has survived at all, it has done so on account of its inherent vitality. The need of Government assistance has been emphasised by Mr. Norton Breton, a great London authority on silk, in a lecture on "Sericulture in the British Empire" before the Royal Society of Arts in the following words :—

> "Why should the Governments of these countries be so concerned in the establishment of sericulture and why should not private enterprise do it? I am all out for as little government interference as possible, but in the case of sericulture it is necessary to have the most stringent rules and regulations in regard to the industry if it is to prove successful. Silkworms are prone to infectious diseases and the reproduction of eggs has to be very strictly controlled. However careful private enterprise, in its own interests, might be to keep these diseases at bay, if there is no control, any Tom, Dick or Harry could start the business of egg reproduction and start disease in the country. I think it is better that Governments should encourage the inhabitants to start the industry and exercise the necessary supervision in its early stages."

Government assistance in India.

36. That Government assistance in India is essential is evident from the fact that the industry is at its best in those parts of India where it receives the greatest help and encouragement from the State, *viz.*, Kashmir and Mysore. Their industries have been

literally created from their ashes by State action after both had been laid low by disease. They now show a more advanced sericultural practice than Bengal in spite of its longer traditions and greater fertility.

The Kashmir Monopoly.

37. The problems of development in Kashmir are simpler than those of Mysore, because the whole industry there is run as a State monopoly, from the cultivation of mulberry trees to the disposal of the final product. Stringent mulberry rules impose severe penalties on the cutting of the mulberry leaves except for the purpose of rearing silkworms on behalf of the State. Every rearer has the right to get his leaves free whether from State or private trees provided they are not required for a similar purpose by the owner. No indigenous race of silkworms has been reared but foreign disease free seed is imported from France and Italy and after being supplemented with local seed is supplied free to the prospective rearers in one ounce or half ounce boxes. The cocoons are State property and are delivered to the officers of the department on payment of rearing charges on a scale fixed beforehand. The rate prevailing at present is Rs. 18-12-0 per maund and was raised to its present level from Rs. 16-4-0 per maund only three years back. Thereafter the cocoons are reeled in State filatures, four at Kashmir and two at Jammu, the former including two of the best Italian type each having 192 basins with the latest improvements and labour saving devices. These new filatures are unequalled in the whole of India. Under this system every regulation issued in the interests of the industry can be enforced with the regularity and precision of a State law and this has no doubt aided the industry in its initial stages. But the system possibly suffers at the present stage, like all socialistic enterprises of its kind, from routine, inelasticity, failure to respond quickly to changed technical and market conditions and excessive overhead charges, factors which are fatal to the success of an industrial or commercial enterprise. Owing to our inability to visit Kashmir, we have had no means of deciding definitely whether now that the difficulties of the transitional period are over, the system requires to be changed and whether some scope should not be provided for free enterprise, specially at the cocoon production and reeling stage. Under present conditions there may be a difficulty in resisting the pressure of the now politically conscious rearers and reelers to keep costs at a fixed level and pass on the burden of any loss to the broad backs of the taxpayer. The representatives of the Kashmir Government gave us to understand that political considerations did weigh with the authorities when the price paid to rearers was increased three years back in spite of a falling market, and attempts to reduce output have been resisted by extra economic means. We have seen a report that during the course of our enquiry the Kashmir factory had to be closed owing to the failure of the workers to turn out the requisite amount of work. Some incentive better than occasional rewards, *i.e.*, his own sense of enterprise, must be provided to induce a rearer to produce more

and better cocoons from the same ounce of seed. As we have seen from the experience of the East India Company in Bengal, monopolistic buying of cocoons at a fixed price possibly leads to careless rearing and degeneration of the worms. In Kashmir there is no indigenous worm, as foreign races have not yet been completely acclimatised. This is however a defect of the Kashmir industry; and until it is removed the industry cannot strictly be said to rest on a satisfactory basis. While there is some case for free enterprise at the rearing stage, we do not think that the time has come when the mulberry monopoly and the disease-free seed monopoly may be relaxed. We indeed think that the latter may be imitated in Bengal and other places with advantage.

State assistance in Mysore.

38. The State spends about Rs. 2 lakhs every year to assist the sericultural industry in Mysore. Its sericultural department is efficiently organised and though much remains to be done, as a result of its operations since 1920 the face of the industry has changed. Its work falls under the following declared objects:—

1. Education.
2. Expansion.
3. Research work.
4. Improvement of seed supply.
5. Demonstration and advice.
6. Help in case of silkworm diseases.
7. Loans.
8. Formation of co-operative societies.
9. Establishment of filatures and popularisation of Mysore silk.
10. Improvement of reeling machinery and method.
11. Investigations of markets for silk.
12. Production of high class fabrics.

The department has been able to achieve success in all these objects, but it has done enough to inspire us with confidence in the future of the industry. Its most notable work has been done in the supply of disease-free seed from Government and aided grainages, the evolution of better yielding cross breeds of silkworms, improvements in the local practices of mulberry culture and instruction in better methods of rearing. Improvements in reeling have taken the form of the invention of the Mysore domestic basin which has not yet passed the stage of economic success while its investigations of silk markets have either not proceeded very far or have failed. Very few co-operative societies have been started and fewer still are flourishing and the middleman and money lender yet reign supreme. Some of these functions should have been performed by the Mysore Silk Association which has been started under official auspices but its funds are too limited

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and membership not sufficiently comprehensive to enable it to discharge its duties adequately.

Sericulture in Bengal.

39. We have not had the benefit of receiving adequate assistance from the Bengal Government to enable us to judge exactly the condition of sericulture in that province or the measure of assistance it receives from Government because their brief replies to our main questionnaire were received so late that we had no opportunity of examining them when we were in Bengal. From all appearance however it is certain that the industry is decaying on account of lack of popular interest and Government encouragement. It appears that the Bengal Government maintains under the control of a Deputy Director of Agriculture a sericultural department whose main business is research into problems connected with the improvement of the Bengal silkworm, propaganda advocating improved methods of rearing and the distribution of disease-free seed. No great success has yet attended the work of the department with regard to the first two objects, and the seed distributed through Government grainages and selected rearers cannot be guaranteed as entirely free from disease, since being in the form of cocoons and not cellular *eggs* as in Mysore and Kashmir, it is one degree removed from absolute safety. The reeling branch of the industry is under the control of the Department of Industries. This bifurcation of control over an industry which is an organic whole, and whose problems are best treated as a whole, results in our opinion in an unfortunate division of responsibility and a certain loss of efficiency. The mortality among worms on account of disease which cannot be controlled without government assistance is still high. The only organisation looking after the needs of the industry is the Bengal Silk Committee, consisting of the representatives of the various interests concerned, with the Director of Agriculture as ex-officio Chairman, and though it has been in existence since 1908 no results of its activities were brought to our notice. We could get no clear information from the Director of Industries about the numerous filatures which were distributed over the province in the days of the East India Company and were later run by Europeans until the last of their kind owned by Messrs. Anderson Wright and Company was closed as late as 1927. We think improvements in reeling should be the increasing concern of the Department of Industries and it may be an advantage to vest the control of all operations connected with silk in one department. Whatever difference of opinion there may be regarding the needs of the industry in Bengal, there is universal agreement about the fact that the grants available from the Government are utterly inadequate for this ancient industry which has great future possibilities as a source of subsidiary employment for agriculturists and main employment for the lower strata of *Bhadralog* society. We refuse to believe that what has been achieved by Mysore with its comparatively poor soil is beyond the resources of a province with the history and traditions of Bengal.

Organisation and State assistance in other provinces of British India.

40. The Assam industry being an extension of the Bengal industry is organised on the same lines and our remarks about the methods of its sericultural development and the adequacy of State assistance in Bengal apply equally to Assam. The Bihar and Orissa Government took over in 1922 from the Government of India the sericultural section of the Pusa Imperial Agricultural Institute and is now running it as a Silk Institute at Bhagalpur for the benefit of its important *tasar* silk industry. No research is done, its scope for work on the lines we have indicated being limited by want of funds, but it produces improved seed cocoons. The Punjab Government maintains a small sericultural section under the Director of Agriculture which distributes imported foreign seed and undertakes to sell the cocoon so produced at exhibitions organised by it. The Madras Government has a small sericultural staff whose operations are facilitated by the fact that the principal silk producing taluk—Kollegal—adjoins Mysore and is therefore able to get the full benefit of the work done for silk by the Mysore Government. The rearers get their seed requirements from Mysore, but disease-free cellular seed is produced at the Government farm at Hosur and sold at much less than cost price to the Kollegal rearers. It is hoped to cover the entire area in this way within a few years. The department has recently produced an improved reeling charkha which combining, as it does, the technical improvements of modern reeling and the economical working of the old charkha holds out a fair promise of success after it passes the experimental stage. It is also carrying on experiments in *eri* silk worm rearing.

Necessity for co-ordination and central action.

41. It is clear from our survey that some co-ordination of these isolated activities is necessary in the interest of efficiency and economy. Concerted action in the industry in all parts of India is imperative for the existence of the industry as also for its improvement. Disease knows no boundaries and it is quite conceivable that all the efforts of the Kashmir, Mysore and Bengal Governments to reorganise their industries may be frustrated if diseased seed continues to be used in the adjoining areas of the Punjab, Madras and Assam. The supreme problem of finding markets for the finished product is best tackled on national lines. The neighbouring Governments could combine to maintain a regional organisation for research, propaganda and production of disease-free seed. But such combinations of States and provinces jealous of their rights and privileges are difficult to work in practice and some all-India organisation is necessary. A convenient means of central co-ordination and control already exists in the Imperial Council of Agricultural Research of which both Kashmir and Mysore are constituent members; but that body does not at present maintain a sericultural section. Whatever spasmodic work the Government of India did at the Pusa Agricultural Research Institute from 1907 onwards on the diseases of silkworms, the improvement of mulberry

and the popularisation of *eri* silk was not particularly successful and was stopped so far back as 1922. The equipment for this work, as we have mentioned above, was subsequently transferred to the Government of Bihar and Orissa. An important result of these researches, however, was the conclusion of Mr. Jameson, a Protozoologist, that " if the practice of using examined seed *is made universal*, coupled with improvements in the silkworm rearing house, in the methods of rearing and in the cultivation of mulberry, *pebrine* could be stamped out ". We maintain that this cannot be done without some legislation and central organisation. We are firmly convinced that protection may do some temporary good but organisation will do something permanent and better. The necessity of some central organisation for the silk industry was emphasised by Mr. Maxwell-Lefroy in his silk report of 1916 and he even worked out a scheme for a Silk Institute, but no action seems to have been taken on it. We think if such a central organisation is decided on, as we recommend it should be, it should be set up as a section of the Imperial Council of Agricultural Research. We presume that when this central organisation is decided on, it will be brought into being by a declaration that the development of the industry is expedient in the public interest as contemplated by Item 20 in Part I of Schedule I to the Devolution Rules and Item 26 of the List of exclusively Federal subjects given in Appendix VI of the White Paper on proposals for Indian Constitutional Reforms. The Japanese Government have compelled by law all the sericulturists in Japan to join the Japanese Raw Silk Association. Some such step may be necessary in the long run in India as well if funds for research and organisation are to be collected and the benefit of such research and organisation is to be carried to every sericulturist in the whole of India.

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CHAPTER III.

The Silkworms.

Characteristics of silkworms.

42. Silk is obtained from the cocoon which the silkworm spins around itself just before it passes into the chrysalis stage of its existence. Sir George Watt in "The Commercial Products of India" emphasises the necessity in India of treating "the subject of silk and the silk industries under two distinct sections, *viz.*, *Bombycidæ,* the domesticated or mulberry-feeding silkworms; and *Saturniidæ,* the wild or non-mulberry feeding worms". He also points out that the terms 'mulberry' and 'non-mulberry feeding' are more accurate than 'domesticated' and 'wild', since some of the so-called wild insects have existed for centuries under what must be characterised as a degree of domestication. There are however certain main characteristics common to all kinds of silkworm. The worm is hatched from an egg, so small and light that the weight of forty thousand eggs is only about an ounce. From the moment of hatching the caterpillar grows with great rapidity. During its life of 26 to 38 days it moults four times; its length increases by 30 times and its weight by 10,000 times. About a week after its fourth moult the worm reaches its maximum development and is ready to spin its cocoon, which is formed of a continuous filament of silk fibre; this work may take from one to three days. The worm then changes into a chrysalis and remains dormant inside the cocoon until it is transformed into a moth. The duration of the chrysalis period depends much upon climate, and may vary from about a week in heat and damp to a year in low temperatures. The moths upon emergence from the cocoon have no other function to perform than that of arranging for the next generation of their kind. The male moth's existence terminates when he has fertilised a female; and the female's life ends as soon as she has laid her eggs. The interval between the laying of the eggs and their hatching will vary with the nature of the race of silkworm. If they are univoltine, a race which breeds only once a year, the eggs must be kept in a cold temperature till about a month before it is time for them to hatch, when the temperature is raised and the eggs are kept in incubation for 25 to 30 days until they hatch. In the case of multivoltine races, the period between the laying of the eggs and their hatching need not exceed 10 days; but it may be prolonged by keeping the eggs in a low temperature.

(1) The '*Tasar*' Silkworm.

43. Apart from the mulberry feeding worms three important species of silkworm are found in different parts of India. *Antheræa Paphia*—the *tasar* silkworm—which occurs mostly in the tract of country bounded by the Ganges on the north, the Godavari on the south, the Orissa coast on the south-east and the Nerbadda River and the Kaimur mountains on the north-west. It is however not

uncommon north of the Ganges, and it has been found as far south as Mysore. The production of *tasar* silk is an important industry in the provinces of Bihar and Orissa, and the Central Provinces, and also in the neighbouring Mirzapur district of the United Provinces. The Central Provinces claim to produce 2,000 maunds of silk a year worth Rs. 14 lakhs, all of which is used locally. No estimate has been given of the quantity or value of the present production in Bihar and Orissa; but we are told that the average quantity exported from the province for each of the five years ending 1921-22 was 2,900 maunds valued at Rs. 31·62 lakhs. The annual production of silk in the United Provinces is said to be about 1,000 pounds. The *tasar* silkworm feeds on a variety of jungle trees, its commonest diet being the leaf of the *terminalia tomentosa* (asan) or *shorea robusta* (sal). Seed cocoons are collected from the jungles and kept in the rearer's house till the moths emerge; the moths will not pair in captivity, so the males are allowed to fly away, while the females are retained by a thread attachment in order that other males may come and pair with them. The day after the male moth's visit the female lays her eggs and dies. In about a week's time the eggs are taken to the food tree to hatch. The worms will not feed in captivity, but need protection from such enemies as birds and lizards, and a watch has to be kept in order to transfer the worms from one tree to another as the leaf is consumed. After about eight weeks the worms spin their cocoons. Three crops are commonly raised in the year in June, October and January. The silk is reeled from *tasar* cocoons but the method differs from that followed in the case of mulberry fed cocoons. The *tasar* cocoon is so constructed that if it is completely immersed in water the water will penetrate to the inside of the cocoon and thus prevent proper reeling; so the cocoons are merely dipped in water, and then placed on wooden stands from which the filament is unwound. Reeling is usually done by the women of the weaver's families; and nearly all the silk is used for local manufactures.

(2) The '*Muga*' worm.

Anthera Assama, the *muga* silkworm of Assam, is found chiefly in Assam though it also occurs in the adjoining parts of Bengal and Burma. This worm is more domesticated than the *tasar* worm. The eggs hatch and the cocoons are spun indoors, and it is only while the worms are feeding that they are placed out of doors on trees. The *muga* worm is generally fed on a kind of laurel, the *machilus odoratissima* (*sum*) or the *tetranthera monopetala* (*sualu*), and constant watching is necessary to protect the worms while feeding from birds and bats. Two broods are usually raised in a year. The cocoon is stifled by the heat of the sun or fire and the silk is easily reeled. *Muga* silk is almost all woven into cloth locally. A rough estimate gives the quantity of *muga* silk produced annually at 1,000 maunds valued at Rs. 8 lakhs in addition to cloth woven from *muga* silk valued at Rs. 2 lakhs a year.

Attacus Ricini—the *eri* worm—is found in Assam and Bengal, while experiments are being made to see if it can be reared success-

(3) The '*Eri*' worm.

fully in Bihar and Orissa and in Madras. This worm lives mainly on the leaf of the castor oil plant; it is multivoltine and is reared entirely within doors. As a rule four crops are raised in a year. The peculiarity of this species is that the cocoons are so soft and the filament so delicate that the silk cannot be reeled off and must be spun. It is therefore unnecessary to kill the larva inside the cocoon and the moths are always allowed to emerge. The silk spun from the *eri* cocoon is comparable with that spun from the waste of mulberry silk. The annual production in Assam is estimated at about 500 maunds worth Rs. 80,000 in addition to cloth woven from *eri* silk valued at Rs. 4·20 lakhs. The quantity produced in other parts of India is negligible. The comparative qualities of *muga* and *eri* silk are sufficiently illustrated by the prices quoted for each variety. *Muga* silk is now worth Rs. 800 a maund, while the value of *eri* silk is only Rs. 160 a maund. *Muga* silk used to be the dress of the upper and middle classes of Assam, while the poorer classes used to wear *eri* silk and the use of mulberry silk was restricted to royalty.

Enquiry restricted to the mulberry feeding worm

44. For the purpose of the present enquiry we have not thought it necessary to study the production of these silks in any detail. No silk is at present imported into India which competes directly with any of these varieties though there must always be a certain amount of indirect competition. Each of them supplies a demand which is in the main confined to the immediate neighbourhood where the silk is produced. Moreover, imperfect as we find the statistics of the production of mulberry silk, the information regarding the other silks which we have been able to collect is so meagre that it would be dangerous to base any conclusions upon it. That there has been a substantial fall in the price of the silks is suggested by the Superintendent of Sericulture, Assam, who compares present prices with those which prevailed at some period " in the past " which has not been stated:—

TABLE XVII.

	"In the past."*		Present price.		Percentage of fall.
	Rs.	A.	Rs.	A.	
Reelable *muga* cocoons per 1,000	6	0	2	8	42
Empty *eri* cocoons per seer (2,000)	3	0	1	4	42
Best *muga* yarn per seer (2 lbs.)	50	0	25	0	50
Mulberry silk per seer	40	0	12	0	70
Eri silk per seer	14	0	4	0	71

If we may conclude from these prices that the price of *eri* silk has fallen rather more, and the price of *muga* only little less than that of mulberry silk, the fact that we have received not a single suggestion that any local production of *tasar*, *muga* or *eri* silk need protection is sufficient to justify our action in confining our examina tion of the costs of production to the mulberry silk industry.

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* Mr. Maxwell-Lefroy in his 1916 Report quotes the following prices for the different kinds of Assam silk; *eri* silk Rs. 5 to Rs. 7 a seer; *muga* silk Rs. 10 to Rs. 30 a seer; mulberry silk Rs. 16 a seer.

The varieties of the mulberry feeding worm.

45. Of the *Bombycidae*, the mulberry fed silk worms, thre varieties are found in Bengal; two of these occur also in Assam A fourth variety is established in Mysor and the adjoining part of the Madra Presidency. Kashmir imports seed of man varieties from France, Italy, Baghdad an China. The Punjab imports a small quantity of seed from France, Mysore, Madras, Bengal, Assam, and Bihar and Orissa import small quantities of foreign seed for the purpose of introducing to the local breeds new and improved strains. The races which may be said to be established in India are:—

1. *Bombyx Craesi*—*Nistari* or *Madrasi*—Multivoltine, Bengal.
2. *Bombyx Fortunatus*—*Desi* or *Chotopolo*—Multivoltine, Bengal, Assam.
3. *Bombyx Textor*—*Barapolo*—Univoltine, Bengal, Assam.
4. *Bombyx Meridionalis*—Multivoltine, Mysore, Madras.

The varieties usually reared in Kashmir are all univoltine. The State hopes in time to acclimatise all the races; but at present depends largely on imported seed. The races commonly cultivated are French and Italian Yellow, White Baghdad, and crosses between Chinese Golden Yellow and French and Italian Yellow races. In Mysore a number of experiments are being conducted and a number of hybrids are being produced between Chinese and Japanese univoltines and bivoltines and the local Mysore race. Madras is attempting hybridisation between French univoltines and the Mysore race. Some Chinese univoltine seed is used in Bengal; and in Assam hybridisation is being carried on with French and Japanese races.

The choice of the univoltine or multivoltine races.

46. The main consideration in determining the choice between the univoltine and multivoltine races is that of climate. In tropical and sub-tropical climates where supplies of mulberry leaf can be obtained throughout the year the most satisfactory results are obtained from the succession of crops produced by the multivoltine races. Where there is a long and severe winter during which no mulberry leaf is obtainable, it is only possible to rear the univoltine races, the eggs of which require a long hibernation. The cocoon of the univoltine races contains more silk than that of the multivoltine worms, and on this account attempts are frequently made to improve the silk content of the multivoltine cocoons by crossing univoltine with multivoltine races. But the supply of cocoons at regular intervals throughout the year by the multivoltine races is so great an advantage, that wherever climatic conditions permit it is more economical to rear these races. In India the climate of Kashmir and the Punjab favours the production of univoltine races, while in all the other parts of the

country where sericulture is practised multivoltine races can be reared successfully. It is true that in Bengal one of the races is univoltine; but along with this race, which in the cold weather yields a crop of white silk of high quality, there are two multivoltine races which are cultivated throughout the year. The following statement gives for various races of silkworm, univoltine, bivoltine, and multivoltine now cultivated in different parts of India, such particulars as we have been able to collect regarding the period of rearing and the weight and silk content of the cocoons.

TABLE XVIII.

Province or State.	Race of worm.	Total rearing period days.	Number of cocoons to the pound.	Length of filament metres.	Denier* of filament.
	Univoltines.				
Kashmir	Cevennes (French)	35	243	750	2·36
	Pyrenees ,,	35	236	750	2·46
	Var ,,	36	238	720	2·25
	Brienza (Italian)	34	223	899	3·16
	Raiella ,,	33	242	900	2·65
	Ascoli ,,	34	218	718	2·41
	Gran Sasso ,,	37	153	1,000	3·00/2·34
	Abruzzo ,,	34	195	1,000	2·40
	Bagdad White	42	173	770	2·87
	Chinese White	32	388	053	2·25
	,, Golden Yellow	31	278	722	2·64
	,, Cross Yellow	33	273	743	2·57
Mysore	Chinese	29½	490	517½	2·20
	Japanese	30	470	591	2·41
Madras	French	42	250	914	2 to 2½
	Bivoltines.				
Mysore	Chinese	30	485	576	1·75
	Japanese	30	500	562½	2·42
	Multivoltines.				
Mysore	Pure Mysore	33	600	394	1·90
	Fixed Races (Mysore) Cross Breeds.	30	515	506	1·50
	Mysore × Chinese univoltines.	26	475	607½	2·00
	Mysore × Chinese bivoltines	26	475	591	2·00
	Mysore × Japanese univoltines	26	480	557	1·86
	Mysore × Japanese bivoltines	26	480	675	2·01
Madras	Mysore	28 to 30	500	274	1¾ to 2
	Hybrid—Mysore French	28 to 33	350	549	1¾ to 2¼
Assam	....	24 to 45	1,300	..	..

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* The Denier is the weight in half decigrams of a length of 450 metres. This is the accepted method of stating the fineness or coarseness of silk.

The Bengal Government inform us that the cocoon of the Bengal univoltine worm (*barapolo*) gives a yield of 2 grains of silky substance as compared with 2·8 grains obtained from Japanese univoltines and 2·3 grains from Chinese univoltines. The Bengal multivoltine worms give from 1·25 to 1·75 grains of silky substance per cocoon. It is clear from the above statement that while the rearing period is on the whole longer in the case of the univoltine races, thus involving greater expenditure in feeding and tending the worms, the cocoons are generally heavier and the filament appreciably longer and heavier than that of the multivoltine races. The statement also illustrates the great improvement in the yield of silk which has been obtained by the hybridisation experiments conducted in Mysore.

The life of the silk-worm.

47. The life of the silkworm is divided into five periods or 'ages' by the four moults through which it passes. At each moult the worm casts its skin growing bigger and bigger on each occasion. One of the difficulties to be overcome in rearing silkworms is to ensure uniform development, that as far as possible all the worms begin and cease to moult at the same time. During their first age, when the worms are very small and delicate they must be fed only on the tenderest leaves chopped very fine; food should be given frequently and in moderate quantities, so that the supply of fresh food is never allowed to be exhausted. In this age the worms grow from 10 to 15 times their original weight. Besides food the matters which require most attention in the rearing of the worms are (1) spacing, in order to see that with their rapid growth they are not overcrowded; worms which occupy one tray when they are hatched will require at least twenty trays before they begin to spin cocoons: (2) cleaning, so as to remove litter and remains of food; this should not be attempted till the worms are two days old; when first hatched, they are so small and delicate that they are liable to be lost or injured: (3) The temperature in the first age should be maintained steady and rather high. The worm's second age is very short, but the rate of development is so rapid that each operation must be performed with great promptitude for there will be no chance to make up lost time. The leaves with which the worms are fed at this stage must not be coarse, but need not be quite so tender as in the first age. We notice in paragraph 77 the practice in Bengal of feeding worms from the second age onwards by laying branches of mulberry on the trays instead of giving them chopped leaf. Spacing and cleaning must be attended to, and the temperature must be maintained steady as before. During their third age the worms increase from 75 to about 350 times their original weight. As their development increases they require less constant attention. They may be fed with more mature leaves chopped into larger sizes and the quantity of food must be increased each time. Four cleanings will be required in this period; spacing and the maintenance of one uniform temperature should be watched; and attention should also be paid to ventilation. In the fourth age the worms may grow to

about 2,000 times their weight when hatched. They now require so much more food and so much more room that labour and the cost of labour become the most important factors in rearing. The number or frequency of feeds need not be increased, but three or four times the quantity of leaf must be given on each occasion. Cleaning must not be neglected; the temperature may be reduced by about a degree; but ventilation becomes more important in order to keep the bed dry. The fifth age is the longest; and the worms are most voracious, eating in this one period three-fourths of the total quantity consumed during the entire period of rearing. The leaves must be the most mature and a large quantity must be fed at a time. Cleaning must be done more frequently; spacing will be necessary twice in the period; and the temperature may be reduced about four degrees, with the same degree of humidity as before, but freer ventilation. At the end of this period the worms show signs of ripening in a sluggish appetite, a shrinkage in length, a yellowish colour and a round shape, while the excreta become soft, sticky and finally faint and green. They are then ready to mount on the cocoonage to spin their cocoons. By this time the silk glands in the body of the worm are greatly enlarged and represent as much as one-fifth of its weight. To spin the cocoon the worm must have support on two sides. It first stretches a filament of silk, discharged from a small orifice near the mouth from one side to the other several times until it is sufficiently thick and strong to form a sort of hammock. Then lying on this hammock the worm weaves a similar layer above itself. The cocoon is then spun between these two layers with a continuous filament traced in the form of a series of figures of eight. In the case of the Mysore race of worms the whole operation of spinning the cocoon takes about twenty-four hours; other races may require longer time.

सत्यमेव जयते

Diseases of the silk-worm : *Pebrine.*

48. There are several diseases to which the races of silkworms are specially liable. The most serious of these which still has a devastating effect upon the industry in many parts of India is *pebrine*. This is a parasitic disease which nearly always originates in the gut as a result of the consumption of contaminated food. As the infection spreads it affects the reproductive organs and infects the eggs, and *pebrine* is therefore a hereditary disease. It is also contagious; for young worms hatching out with the disease in them may infect healthy worms with which they come in contact. The only way of insuring against the occurrence of hereditary *pebrine* is to use seed which is guaranteed to be disease free. We describe in a later Chapter the methods by which this seed is prepared. Since however the disease is also contagious, a successful crop cannot be expected even from disease-free seed if it is exposed to infection in the form either of contaminated food, or an infected rearing room or trays, or association with worms hatched from seed which is not disease free. Considering the havoc which this disease has in the past wrought in the sericultural industry of Kashmir and Bengal, not to mention other parts of the

country, no effort should be spared by the local Governments interested in the development of the industry to provide all rearers with a full supply of disease-free seed. This object has been achieved only in Kashmir. At present about 27 per cent. of the seed used in Mysore is either disease free or the direct produce of disease-free seed and one half of that used in Bengal is produced from cocoons reared from disease-free seed. Until the use of seed which is not disease free is completely stopped, the risk of infection will continue. We are convinced that the first measure which should be enforced upon the industry is the use of disease-free seed; and before this can be done the supply must be sufficiently increased and the price reduced. The measure of success which has attended the partial supply of disease-free seed in Mysore indicates what a great benefit would result if nothing but disease-free seed were used.

Other diseases.

49. A disease which is nearly as destructive as *pebrine* is *flacherie,* which is a digestive disorder, ascribed by Japanese specialists to over heating, over humidity, overcrowding, bad ventilation and dirty, coarse, wet or fermented leaf, in other words to careless or inefficient rearing. The only way to prevent this disease, which is always fatal, is to induce the rearers to adopt healthy and sanitary methods. Another digestive trouble is *grasserie* which is a kind of dropsy, caused by unsuitable food. *Muscardine* has caused a certain amount of loss in Bengal and Kashmir. It is caused by a fungus or mould which obtains a lodgment in the body of the worm and eventually causes its death. It is most infectious—the contagion being carried by spores which can be destroyed by sulphur fumes. In Bengal and Assam the silkworm is liable to attack by a *fly pest.* The fly lays eggs on the body of the silkworm and a maggot which hatches from these eggs eats its way into the tissues of the silkworm and lives on its body for its larval period of about seven days. If during this period the silkworm spins its cocoon, the maggot eats its way out through the cocoon which it renders unreelable. The remedy advocated by the Bengal Government to prevent loss from this pest is to fit all doors and windows with a fine wire gauze. Unfortunately this remedy is beyond the means of most of the rearers in Bengal.

Wastage in silkworm: *Rearing.*

50. The evidence placed before us indicates that the incidence of wastage is heaviest in Bengal and lightest in Kashmir,—Madras and Mysore occupying an intermediate position. But even in Kashmir the loss is betwen 20 and 30 per cent. In Mysore the loss is about 40 per cent., and in Bengal the estimate of loss is pitched as high as 55 per cent. The Kashmir witnesses say that about half their loss is due to carelessness on the part of the rearer, usually in regulating the temperature of the rearing house; the other half of the loss is caused partly by diseased seed and partly by failure of the eggs to hatch. Seeing that in Kashmir all the seed is prepared and distributed by the State 15 per cent. is too

high a percentage of loss on account of defective seed. Mysore claims to have made a considerable reduction in its loss, the average yield from 100 layings of seed being now 40 lbs. of cocoons as compared with 25 to 30 lbs. in 1918. But the present figure is nothing to be proud of, and in Mysore there is still room for a vast improvement. In Bengal of the seed supplied from private sources from 60 to 70 per cent. is lost; while of the so-called disease-free seed supplied from Government grainages it is said that 15 per cent. is unproductive. In spite of the efforts made by the various governments disease still takes a heavy toll and causes much avoidable loss. If this loss were saved a material reduction in the cost of production would follow.

सत्यमेव जयते

CHAPTER IV.

The Mulberry.

Indian varieties of mulberry.

51. Three species of the genus *Morus* (mulberry) are said to be indigenous in India; but at present the sericultural industry depends mainly upon two. These are the *Morus Alba,* which is the chief mulberry used for silk-production in Kashmir and the Punjab, and the *Morus Indica,* varieties of which are cultivated in Bengal and Assam, Madras and Mysore. The *Morus Nigra* also occurs in Kashmir, but its leaves are only suitable for food for worms of mature age. The *Morus Alba* in Kashmir and the Punjab is always grown as a tree; the *Morus Indica* is generally cultivated on what is known as the bush system; but we shall see that attempts are being made alike in Bengal and in Mysore to induce the cultivator to grow it as a tree either in addition to or in substitution for his bush cultivation. In Mysore attempts have been made to improve the local mulberry by introducing new varieties from China and Japan and by uptodate methods of pruning and grafting. In other parts of the country attempts to improve the yield and reduce the cost of mulberry cultivation have generally taken the form of experiments with different kinds of manure, or arrangements to maintain a supply of cuttings, seedlings or saplings adequate to meet all demands. We have also noticed that the attempts of the Bihar and Orissa Government to acclimatise the mulberry of Bengal in the uplands of the Chota Nagpur plateau have met with a considerable measure of success.

State encouragement of mulberry : Kashmir.

52. All the provincial and State Governments which are interested in the sericultural industry maintain one or more nurseries where their efforts to improve the supply and reduce the cost of the leaf are concentrated. Thus the Kashmir State maintains sixteen nurseries, six in Kashmir and ten in Jammu, where a number of seedlings are raised every year from the seed of selected trees; and at the age of four years or so these seedlings are distributed free to landowners who wish for them. The State is now in a position to distribute fifty or sixty thousand plants a year; and if there was an assured demand they could without difficulty increase their production to two or three lakhs of plants a year. To induce the local landowners to replenish and increase the stock of mulberry trees in the State, the Durbar has since 1928-29 offered to pay a small compensation for the labour involved in attending to the plants for the first three years after transplantation. The work involved is watering the plants three or four times in seasons of drought, protecting them from cattle, and hoeing them two or three times. The payment is made at the rate of four annas a plant in the first year, and two annas a plant in each of the other two years. Experience has shown that this scale of payment is a

sufficient remuneration to induce the landowner to plant more trees. At the present time sixty per cent. of the mulberry trees in the State are on Government land and forty per cent. on private land. By the law of the State all mulberry trees whether on Government or private land are protected from damage and from being used for any purpose other than the feeding of silkworms. During the last five years 218,419 trees have been planted under these conditions and 75 per cent. of them have been reared successfully. A further concession has recently been granted to landowners by which they are allowed to retain free of charge the wood of mulberry trees dead or fallen on their land.

The Punjab.

53. In the Punjab most of the rearers get their supply of mulberry leaf from trees growing along the banks of canals which run through the localities where the industry is practised. The Forest Department has some plantations and there are some trees on roads belonging to certain District Boards. Occasionally rearers grow trees in their own lands. The Forest Department makes no charge for collection of leaf from its plantations; the Irrigation Department and District Boards charge for leaf from their trees Re. 1 per ounce of silkworm seed reared. The Irrigation Department maintains nurseries in which cuttings and seedlings are reared. When the temporary mulberry staff of the Agricultural Department, which had been employed for some years, was disbanded in 1930, over 25,000 of these cuttings and seedlings were distributed free of cost to cultivators, schools and District Boards. It does not appear that the nurseries attempted anything more than the provision of a supply of cuttings and seedlings.

Bengal.

54. In Bengal the Government maintain twelve nurseries. Their activities have been directed mainly to increasing the yield of mulberry leaf by the application of adequate and suitable manure and to promoting the cultivation of mulberry as a tree instead of as a bush. One of the chief obstacles to the extension of the cultivation of the mulberry as a tree was the prevalent idea that a tree would not yield leaf more than twice a year, and would therefore not provide a frequent enough supply of leaf to feed the multivoltine races of silkworm of which four or five crops are raised in a year. In his annual report for 1930-31 the Deputy Director of Sericulture, Bengal, claims that it is " now established that the indigenous mulberry varieties when set up as trees yield leaves six times in a year." In seven of the twelve nurseries there were at the end of 1930-31 over 21,000 trees established, 9,000 of them being upwards of three years old. The advantages of tree over bush cultivation are summarised thus; bush mulberry in some cases lasts for 25 years, but in other cases has to be renewed after eight or ten years; on the average its life may be put at fifteen years. Trees have been observed in good condition when more than fifty years old, and it can safely be inferred from observations made at one of the Bengal nurseries that the life of the tree will never be less than 20 or 25 years. Even in 15 years there is a distinct

gain in growing the mulberry as a tree, as may be seen from the following statement reproduced from page 139 of the Annual Report of the Department of Agriculture, Bengal, for 1930-31:—

TABLE XIX.

	BUSH MULBERRY PER ACRE.		TREE MULBERRY PER ACRE.	
	Cost of cultivation including manure.	Yield of leaves.	Cost of cultivation including manure.	Yield of leaves.
	Rs.	Mds.	Rs.	Mds.
1st Year . .	300	...	115	...
2nd ,, . .	240	150	90	...
3rd ,, . .	240	180	60	75
4th ,, . .	240	210	60	150
5th ,, . .	240	240	60	190
6th to 15th Year (10 Years) . .	2,400	2,400	450	1,900
In 15 Years . .	3,600	3,180	835	2,315

The estimate of cost and yield are based upon the practice in the Government nurseries where all labour and manure have to be paid for. The ordinary villager's cost of cultivation is probably not more than one-third of that incurred in a Government nursery. But even on the figures given in the statement it will be seen that the yield from bush mulberry is 71½ pounds for each rupee of expenditure as against 227 lbs. from the tree. Moreover the trees are planted 10 to 12 feet apart and agricultural crops can be successfully raised between them. By the end of 1930-31, 21,000 year-old plants had been supplied to villagers to plant as trees, and it was reported that the demand was in excess of the supply.

Mysore.

55. The Mysore State has established four central farms with four subordinate farms and 17 outposts, in which experiments are being conducted along the following lines:—

(a) Manurial experiments on mulberry.

(b) Improvement of Mysore mulberry by grafting and budding.

(c) Comparative study of the cost of cultivation and yield from bush and tree mulberry.

(d) Propagation of foreign varieties of mulberry.

(e) Propagation of Mysore mulberry by means of seedling.

(f) Comparative study of the cost of cultivation and yield from the several methods of cultivation in vogue in various parts of the State.

(g) Isolation of male and female varieties of Mysore mulberry.

(h) Eradication of mildew which attacks mulberry plants.

(i) Experiments to determine the best time of day to harvest mulberry leaf.

The State has an organisation for the supply of mulberry cuttings and seedlings to those who wish to grow them, and it has granted concessions for the formation of mulberry topes. It is claimed that the more intelligent villagers within a radius of 10 or 15 miles of a Government farm have been influenced by precept and by example to apply adequate and suitable manure to their mulberry. The attempts to encourage the plantation of mulberry topes have been only partially successful. Between 1926 and 1932, 19,300 saplings were supplied of which 50 per cent. are said to have been failures. About 32 acres have been planted as topes—200 trees to the acre 15 ft. apart—and trees have also been planted along the boundaries of cultivated fields. The Mysore Government claim that by the introduction of the practice of cultivating mulberry as a tree they have reduced the price from 2·7 pies—which it costs a cultivator to produce a pound of leaf from bush mulberry—to ·62 pie a pound, as shown in the following statement of cultivation costs in the Government mulberry garden, Mysore:—

TABLE XX.

Statement of cultivation costs in the Government mulberry garden, Mysore.

Year.	Area. Acre.	TREE MULBERRY.					
		No. of trees planted 15 ft. apart.	Expenditure incurred during the year on 1 acre.	Yield of leaf per acre (five pickings).	Average yield of leaf per tree during the year (five pickings).	Age of the tree.	Cost of production of 1 lb. of tree mulberry leaf.
			Rs. a. p.	lbs.	lbs.	Yrs.	pies.
1930-31 . .	1	192	32 8 0*	3,440	17·9	8½	1·81
1931-32 . .	1	192	21 4 0†	5,221	27·1	9½	0·62

* 1930-31: The expenditure of Rs. 32-8-0 does not include the amount spent on inter-crops during this year. The amount spent on inter-crops was Rs. 23-9-8 for one acre and the receipt got from one acre was Rs. 27-10-8.

† 1931-32: The expenditure includes the amount spent on inter-crops also. The receipts got from inter-crop alone are Rs. 17-9-8 for one acre.

Madras.

56. The Government of Madras have established farms at Coonoor, Hosur and Palmaner. The mulberry at Coonoor is liable to attack by a fungus disease in the rains; and on this account the activities of the farm have been restricted to the raising of one univoltine crop of silkworms in the year and two or three hybrid crops in the dry months between January and May. At the Hosur and Palmaner farms the main activity is the production of disease-free seed and the cultivation of mulberry is limited to the quantity required for this object. Neighbouring villagers have however taken an interest in the Hosur farm and on their application cuttings have been supplied for the cultivation of 32 acres of land. Generally speaking, the Madras Government have not so far attempted any measures calculated to increase the yield of mulberry leaf or to reduce the cost of producing it.

Methods of cultivation.

57. We have already indicated that various methods of cultivating the mulberry are followed in different parts of the country. In Kashmir the tree is cultivated only for the first three years after its transplantation. Thereafter it is given no attention beyond such pruning as is involved in the cutting of the branches in collecting the supply of leaf. The practice appears to be the same in the Punjab where too the mulberry is grown as a tree. In Bengal the traditional method of cultivating the mulberry is as a bush. The cuttings are planted out in rows 1½ to 2 feet apart on the high level land. In each row the cuttings are set as close as possible to each other. Before the cuttings are planted the land is ploughed and manured. Every year the bush is cut down level with the ground and the earth is dug and manure may be added. With attention on this scale the bush will continue for 10 to 15 or even more years to yield leaf at the rate of 16,000 to 19,000 lbs. per acre per year—enough to feed four crops of silkworms, an ounce of seed being used for each crop. The method of cultivating the mulberry as a tree, which the Bengal Government is trying to popularise, involves planting out year-old saplings at intervals of 10 or 12 feet—which allows 200 or 300 trees to the acre. The trees do not reach maturity for four years; but from that age onward each tree should yield at the rate of 60 to 80 pounds of leaf a year—and once the tree is established it requires practically nothing spent upon it, while food crops may be grown among the trees to give the cultivator an additional return.

Methods of cultivation in Mysore.

58. Of three varieties of mulberry formerly grown in Mysore, one has almost disappeared, while the other two are grown in all parts of the State where sericulture is practised. In Mysore alone the mulberry is grown both on irrigated and on unirrigated land. In other parts of India it is never irrigated and even in Mysore nearly three-fourths of the land on which mulberry is grown is unirrigated.

TABLE XXI.

Statement showing the area under mulberry.

Year.	Dry.		Tank irrigated.		Deep well irrigated.		Irrigated by shallow wells		Total acres.
	Acres.	Per cent.	Acres.	Per cent.	Acres.	Per cent.	Acres.	Per cent.	
1929-30 . .	30,600	70	6,000	14	3,000	7	4,000	9	43,600
1930-31 .	30,300	71	4,700	11	3,800	9	4,000	9	42,800
1931-32 .	26,900	74	3,800	10	2,800	8	3,000	8	36,500

Average cost of cultivation per acre per year:—

Rs. 63-4 Rs. 36 Rs. 142-8 Rs. 144.

Average yield per acre per year:—

lbs. lbs. lbs. lbs.
About— 5.000 7,000 10.000 10.000

Yield per rupee of cost:—

lbs. lbs. lbs. lbs.
79 81 70 69

It will be observed that the extra cost of cultivating land irrigated by well—either deep or shallow—is nearly but not quite made up by the greater yield of leaf. The inducement to incur the additional expenditure of irrigating the crop from a well is that by this means a supply of fresh leaves can be obtained in the hot weather, thus making it possible to raise one or two extra crops of worms in the year. Two methods of cultivating the mulberry are followed in Mysore; the commoner method is to plant cuttings in pits 9 inches apart, the pits being arranged in rows about 2 feet apart. At each harvest the leaves are plucked off the twigs, and the plants are pruned to the ground only once a year. The other method is to plant the cuttings close together in rows about 1 foot apart, and to cut the plants level with the ground at each harvest. This method is usually followed on irrigated land in order to economise as much as possible the use of the water. The comparative merits of these methods of cultivation are being tested in the State farms; but no useful results have yet been ascertained. The method of cultivation in the Kollegal taluk of Madras is the same as the first of the methods described above.

Yield of leaf.

59. We have seen that there is a readily perceptible relation between the amount spent on the cultivation or irrigation of the mulberry plant and the yield of leaf. Another factor which has an even stronger influence upon the yield is climate. Thus in Kashmir a tree (*Morus Alba*) is said to yield 80 lbs. of leaves a year, while the yield

in Jammu is said to be 100 lbs. . We have seen that in Bengal a tree (*Morus Indica*) is expected to yield 60 lbs. of leaf a year in four pickings; in Mysore the yield per tree is only 27·1 lbs. in five pickings. This difference is accounted for by the greater fertility of the soil in Bengal. The influence of climate is still more clearly evident if the yield of bush mulberry in Bengal, which may be as much as 18,000 or 19,000 lbs. from an acre of unirrigated land, is compared with 6,000 lbs. which is the yield from unirrigated land in Mysore, where the yield even under irrigation never exceeds 15,000 lbs. The figures however are not exactly comparable; for while in Bengal it is a common practice to weigh leaf and twig together, in Mysore this is not done where the leaf is stripped and the twig left in the ground.

Sale price of leaf and cost of cultivation.

60. As a rule the mulberry leaf is used by the man who grows it, so that there is no regular business in the sale and purchase of mulberry leaf. We have received a certain amount of evidence that in Bengal to a fair extent the leaf is bought and sold. In Mysore the practice is not so common. The Director of Industries, Madras, in his written evidence gave the present price of mulberry leaf at Re. 1 per load of 60 lbs. Later he seemed to think that the load contained 80 lbs. of leaf. A similar statement has been made with regard to the price at which mulberry leaf is sold in Mysore, with the additional information that three years ago the same quantity of leaf fetched Rs. 2 or Rs. 2-4 per load, while five years ago it was Rs. 2-8 and in the golden age of the past it reached as high a figure as Rs. 4. As regards Bengal we are told that a bigha of land (one-third of an acre) should yield 80 maunds of leaf which sells for Rs. 25 to Rs. 30—or at the rate of 220 to 260 lbs. per rupee. The following statement compares the selling prices with the costs of cultivation which have been reported to us:—

TABLE XXII.

	Yield per acre.	Cost of cultivation.			Cost of cultivation per lb. of leaf.	Sale price lbs. per rupee.	Sale price per lb.
	lbs.	Rs.	a.	p.	pies.		pies.
Mysore dry land . . .	5,000	63	4	0	2·4	80	2·4
,, tank irrigated . .	7,000	86	0	0	2·4	80	2·4
,, deep well irrigated .	10,000	142	8	0	2·7	80	2·4
,, shallow well irrigated	10 000	144	0	0	2·8	80	2·4
Madras unirrigated . .	3,500	26	8	0	1·5	80	2·4
Bihar and Orissa unirrigated	16,400	62	10	8	0·7	148	1·3
Bengal unirrigated . .	19,680	135	0	0	1·3	240	·8

We are unable to present in this form the information which we have received regarding the yield and cost of mulberry leaf in the Kashmir State or in the provinces of the Punjab and Assam. In Kashmir and the Punjab the mulberry is mostly grown as a isolated tree on field boundaries, on waste lands or on road sides or canal banks. It is not cultivated by the acre. In Kashmir a tree is expected to yield from 80 to 100 lbs. of leaf, and the leaf of 20 trees is required to produce a maund of cocoons. The value of this leaf is estimated at Rs. 5, which works out at 320 to 400 lbs. per rupee or ·6 or ·5 of a pie per pound. In the Punjab we have seen that a rearer who buys mulberry leaf from the Irrigation Department or from a District Board has to pay at the rate of Re. 1 per ounce of silkworm seed reared. If we make the not unreasonable assumption that the same quantity of leaf, 2,000 lbs., is required in the Punjab as in Kashmir to feed the worms hatched from an ounce of seed, the cost of the leaf to the Punjab rearer will be less than ·1 of a pie per pound. In Assam we are told that for " mulberry tree leaves the village rearers incur no expenditure. They grow the food plants at random in their homestead land ". The costs of mulberry cultivation with which we have been supplied from Bengal, Bihar and Orissa, Madras and Mysore include first, the initial outlay necessary when the plantation is first started and secondly, the annual expenditure necessary for the growth of the crop. The initial outlay includes the cost of the cuttings in addition to the manure and labour necessary to prepare and cultivate the land in the first year. The cultivation operations in the following years consist for the most part of the application of manure and the employment of labour in ploughing, pruning, weeding, etc. The manure used is often the refuse from the cultivator's own farmyard or (in Bengal) silt from a tank which costs little beyond the labour of conveying it to the field; and the labour is mostly contributed by the cultivator himself and his household. Since extra money spent on irrigation brings its return in extra crops of cocoons reared on the additional quantity of leaf obtained, and we find that the yield of leaf as a rule increases in nearly the same proportion as the cost of cultivation, we need not take separate account of irrigated land. The figures with which we have been supplied are—

TABLE XXIII.

Annual expenditure on cultivating an acre of dry land under mulberry.

	Bengal.	Bihar and Orissa.	Madras.	Mysore.
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Cost of cuttings . .	...	...	...	5 8 0
Manure	120 0 0	Details not supplied.	6 0 0	25 0 0
Labour			8 0 0	31 0 0
Rent or assessment . .	15 0 0	...	1 0 0	1 12 0
Total .	135 0 0	60 0 0	14 0 0	63 4 0

The extra cost which has to be incurred in the year when the garden is started is stated to be as follows:—

TABLE XXIV.

	Bengal.	Bihar and Orissa.	Madras.	Mysore.
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Cuttings	No information	Details not supplied	1 8 0	1 0 0
Manure			5 0 0	...
Labour			5 0 0	11 0 0
Other charges			...	...
Total	...	20 0 0	11 8 0	12 0 0

In the case of Madras the variation between Rs. 14 shown above and Rs. 26-8 shown in Table XXII is caused, first, by the inclusion in the latter figure of Rs. 10 which represents partly interest on the capital value of the land and partly compensation for the greater income which the cultivator might expect to get from an alternative crop and secondly, by the provision of Rs. 2-8 on account of an annual instalment of the initial expenditure. It is clear that the information which we have received can only be approximate. The cultivator depends largely on his own labour and that of his family. When the selling price falls he spends less on manure and improved agricultural practice, starves his cattle and receives less remuneration for his own and his family's labour. The broad result is a fall in agricultural wages, which trenches seriously on the limited amount of comforts which the peasant allows himself. There may be a further reduction in the aggregate cash value of his wages due to less employment if, as a result of the fall in price of his produce, some of his land goes out of cultivation altogether. But this phase is only temporary. If no change occurs in the relative level of prices, he may continue the cultivation of mulberry. But if there is a change in the relative level of prices, an alternative use of the land may be found and a crop which has ceased to be valuable may be replaced by another which under the altered conditions is more profitable. At what point the transition takes place in the case of mulberry cannot be determined precisely as the boundary line will depend upon the alternative crop which can be successfully grown on the same piece of land and the yields which may be expected from them. In Kashmir there is no alternative to mulberry since it is a wayside or boundary tree and the price could go down as low as its value as a fodder crop. In Bengal we were told that mangoes are possible alternative crops; and sugarcane, under the scheme of protection, may grow into importance. On the Mysore plateau, including Kollegal, the alternative crops are cholam and ragi, and where irrigation facilities are available (there are none in Kollegal) sugarcane and potatoes may serve as substitutes. Broadly speaking, it may be said however that mulberry land will not often go out of cultivation as long as the fall of prices of the alternative crops is not proportionately less than that of mulberry. We have collected figures showing the extent of the changes in the price of other crops and the costs incurred on and receipts obtained from them; but we cannot draw any safe inference from them about the point of transition from mulberry to the alternative crop as there is no regular price of mulberry. Its cultivation is generally combined with silkworm rearing; and cocoons are the agricultural product of these joint operations in which all members of the family take part. We therefore postpone the comparison between the alternative uses of land now devoted to mulberry to a later chapter in which we consider the entire costs of cocoon production. At this stage we shall content ourselves with a brief comparison of the costs of cultivating mulberry in different areas and the prices realised on the small surplus which is occasionally available for sale in them. The statements which we have received from different parts of the country are not strictly exact. They are at best approximations. Yet they suggest a number of questions. It is not clear why cultivation should apparently cost so much more in Mysore than in the adjoining Madras taluk of Kollegal, or in Bengal than in Bihar and Orissa. We have been able to make a close comparison of the costs for Mysore with those for Madras; and we are inclined to think that as regards both labour and manure the Mysore costs are overstated, while the Madras costs under these heads may be too low. We have not had the advantage of such detailed information regarding either Bengal or Bihar and Orissa. We should have expected to find some margin, though not necessarily the same margin in all parts of the country, between the various costs of cultivation and the corresponding current market prices. But from the statement at the beginning of this paragraph we observe that in the case of land irrigated by shallow wells in Mysore the market price is as much as ·4 of a pie a pound below the reported cost of cultivation, while in Bengal there is a similar deficiency of ·5 of a pie a pound. These deficiencies even after making some allowance for the difference between slump prices and the prices anticipated under protection, imply either a grave under-estimate of price or an equally grave over-estimate of cost. We recognise that conditions vary from one province or State to another; for example, in Bengal unlike other provinces or States it is the common practice to weigh the mulberry leaf and twig together; but the variation in the reported costs of mulberry cultivation and prices of mulberry leaf must represent more than mere variation in local conditions.

CHAPTER V.

Seed Production.

Seed production a special branch of the Industry.

61. Wherever the sericultural industry has been established, the production of silkworm eggs or seed has developed into a highly specialised branch of the industry. This is done with two objects; first, in order to maintain and improve the stock by a strict selection of the cocoons and the moths used for the production of seed; and secondly, to save the industry from the ravages of the hereditary disease of *pebrine* (and *flacherie* also, in case it is proved to be hereditary), by a microscopic examination of every female moth after she has laid her eggs, and the total destruction of all the eggs of any moth in which traces of disease are found. In the selection of cocoons attention should first be paid to their history; and from cocoons with a good record those of normal size, shape, colour and weight should be picked out; and among the cocoons so chosen preference should be given to those which are firm to the feel and have a thick layer of silk. The selection of moths should depend upon their colour, shape and markings. Both male and female should have well defined sexual characters, the male having well developed antennae and wings and the female a capacious abdomen. All abnormal moths, for example those with wrinkled or shrunken or deformed wings, humped or crooked bodies, trailing hind quarters, stained abdomen or loss of scales should be rejected. Seed produced for reproduction purposes is sometimes termed 'cellular' as opposed to the 'industrial' seed which is used to produce cocoons for reeling. 'Cellular' seed is so named because each female moth is placed in a separate 'cellule' to lay her eggs. This is done in order that the eggs of each individual moth may be identified, and to make it possible to destroy all the eggs laid by any moth in which the microscopic examination, to which they are all subjected, indicates the presence of disease. The importance of maintaining the quality of the seed is recognised in all parts of India where the industry is carried on. Thus in Kashmir and the Punjab the whole operation of seed production is managed by the Government. In Bengal about half the total quantity of seed required in the province is now produced either in Government nurseries or by "selected rearers". In the Mysore State, Government grainages, 'aided' grainages, selected rearers and sericultural co-operative societies together supply slightly more than one-fourth of the total quantity of seed required. In Kollegal the Government can at present supply only one-tenth of the demand for seed; but to supplement this supply an organisation has been provided to examine the moths of rearers who have not been able to obtain a supply of disease-free seed. In this chapter we shall examine in detail the various measures which have been adopted with the object of improving

the supply of disease-free seed, and consider how far they have been successful.

Imported seed in Kashmir.

62. There is no indigenous silkworm now in Kashmir. Seed is imported every year from France, Italy and other countries; and in addition to the seed imported an increasing quantity of seed of most of the imported varieties as well as of local hybrids is produced every year in Kashmir. The proportion of locally manufactured seed used in recent years is as follows:—

TABLE XXV.

	Percentage.		Percentage.
1926-27 . .	31·8	1929-30 . .	39·4
1927-28 . .	37·2	1930-31 . .	35·5
1928-29 . .	39·2	1931-32 . .	56·2

and we are informed that of the seed kept in hibernation for use in the current season two-thirds are of local manufacture. The imported seed is shipped from Europe in September when there is no extreme variation in the temperatures on the voyage; it is packed in ounce or half ounce cardboard boxes, which are enclosed in a double wooden case. On arrival in Kashmir the seed is placed in hibernating houses which are kept at a sufficiently low temperature by the insertion of snow in the houses. Most of the seed is incubated in the spring; but it can be kept in hibernation till July or August. The temperature is raised gradually in the hibernation house before the seed is removed for incubation. This as a rule is carried out by the rearer in his house where by means of fires he maintains a temperature of about 75°. Experience has shown that it pays best to cultivate cross-breeds, and more and more cross-breeds are being produced every year. Since 1929 systematic work has been done on the acclimatisation of the various races of imported worms, by keeping the cocoons of the various races separate and watching which give the best results. Many of the French and Italian races promise well; but the experiments have not been conducted for a sufficiently long time to warrant any conclusion regarding their ultimate results.

Seed production in Kashmir.

63. The Seed House in Kashmir consists of three buildings which are organised for purposes of operation as one unit. The maximum quantity of seed which can be produced annually is 21,000 ozs. To increase production above this quantity would mean additional buildings and machinery. The largest quantity of seed ever distributed in a year was about 54,750 ozs. in 1929-30; and forty per cent. of the seed used that year was manufactured locally. There is a special area consisting of about twenty-four villages in which alone rearing for reproduction purposes is carried on. There are over a thousand houses in this area,

each of which is regularly disinfected and visited daily while rearing is in progress. The seed used for reproduction is incubated by the State itself and the rearer's responsibility starts when the worms are distributed in the ant stage. The seed produced locally has not given markedly different results from the seed imported from abroad. The loss by disease is put at seven or eight per cent. on the average and there is a total loss of between twenty and thirty per cent. Judging by the information from other provinces and States the cost of seed production in Kashmir is high, amounting to 6 pies per pound of cocoons reared, compared with 4 pies in Mysore, 3 pies in Bengal and 1½ pies in Madras. The extra cost of Kashmir seed is justified in the present circumstances of the industry in that State.

Imported seed in the Punjab.

64. Imported seed chiefly French is also used in the Punjab. It is hibernated at Dalhousie and distributed to the rearers in February. The quantity hatched in each of the last five years has only been—

TABLE XXVI.

	Ozs.		Ozs.
1928 . .	1,853	1931 . .	420
1929 . .	1,476	1932 . .	145
1930 . .	1,220		

and the industry in the Punjab is such a small concern that it is unnecessary for us to examine its condition minutely.

Production of "disease-free seed" in Bengal.

65. In Bengal the provision of disease-free seed is the main function of the eleven sericultural nurseries; and we have seen that these nurseries and selected rearers, supplied with stock seed from these nurseries, have been able to supply about half the total demand for seed. The value of the work done in Bengal is however largely impaired by the fact that disease-free seed is distributed not as 'layings' of eggs from moths which have been found on examination to be free from disease, but in the form of seed cocoons from which the rearer has first to let the moths emerge, pair and lay eggs, before he gets the actual seed. And in this case no examination can be made of every moth, and there can be no guarantee that a case of infection may not escape undetected. Another handicap under which this work in Bengal, in common with Mysore and Madras, suffers is that *pebrine* is communicable not only by heredity, but also by contagion. And when the Government are able to arrange only for a partial supply of disease-free seed, it is quite possible for the worms born of that seed to be infected by the contagion of diseased worms born of unguaranteed seed; and in this way the benefit obtainable from a supply of disease-free seed is nullified. This handicap can only be re-

moved if arrangements are made, as we consider that they should be made, to supply all demands for seed from Government grainages or other guaranteed sources and to prohibit under penalty the use of any other seed.

Selected rearers in Bengal.

66. Of the so-called disease-free seed about half is supplied from Government nurseries direct, and half through selected rearers. The "selected rearers" buy seed cocoons from the Government nurseries from which they raise crops of seed for sale to rearers in the villages. Between 1921-22 and 1930-31 the annual output of seed by these selected rearers rose from four thousand to twenty-five thousand *kahans*, which are equivalent to about fifty thousand pounds of cocoons. From 1929-30 to 1930-31 the increase was about 2,500 lbs. By this means about one-fourth of the seed required in Bengal is now supplied. The Director of Agriculture, Bengal, in his annual report for 1930-31 claims that the selected rearers' seed, though it is only produced under Government supervision, is regarded by the ordinary rearer as practically equivalent to seed produced by Government agency. At the same time we notice that the 96 selected rearers who were recognised in 1930-31 had accommodation for the production of about 12,000 *kahans* in each crop, so that on the average they raised only two crops each in the year. If each of the rearers now recognised were only to double his output, half of the village seed now used in Bengal could be replaced. And if the Government grainages too could double their production, the supply of the present demand for seed in Bengal would be assured. We are informed that the wastage in rearing from village seed is from 60 to 70 per cent. and it is therefore obviously of prime importance that the use of village seed should be prohibited as soon as sufficient guaranteed seed can be supplied.

Supply of "disease-free seed" in Mysore.

67. The annual demand for seed in Mysore in the year 1931-32 was 310,000 ozs. Of this quantity about 10,000 ozs. were supplied from State grainages, 11,000 ozs. from "aided grainages" and 65,000 ozs. by selected seed rearers and co-operative societies. Thus the supply of protected seed represented about 27 per cent. of the total quantity of seed used in the State; but of this protected seed only about one-fourth can strictly be termed disease-free. But even this marks a considerable improvement as compared with the position fifteen years ago. Then it was difficult to persuade rearers to take 200 layings (or an ounce and a half) a year. Now the 86,000 ozs. of protected seed which is supplied is not enough to meet the demand. Of the 10,000 ozs. of seed supplied from State grainages, between four and five thousand ounces were cross-breeds for which there is an increasing demand. The seed of these cross-breeds is about 50 per cent. more expensive to produce; but the period of rearing is curtailed by four or five days, the yield of cocoons is about 40 per cent. higher, and the cross-breed cocoons having a higher silk content fetch a higher price.

The Government grainages have been increasing their production of seed from year to year as follows:—

TABLE XXVII.

Number of disease-free layings supplied.

Year.	Cross-breeds.	Total.
1926-27	165,313	512,664
1927-28	219,818	684,727
1928-29	325,778	813,132
1929-30	324,015	1,044,540
1930-31	297,332	1,290,804
1931-32	565,939	1,387,240

It is urgently necessary in the interests of the industry that immediate arrangements be made to increase this production at least up to the point which will let the whole demand from the rearers be met either from a State grainage or from one of the supplementary agencies which have been organised to supply disease-free seed. The system of "aided grainages" was introduced in 1928 in the hope that qualified men, selected for intelligence and knowledge of the industry, might be induced after taking a course of technique in a State grainage to open "aided grainages" in the sericultural villages. The aid given by the State is in the provision of books free and equipment at concession rates, assistance in procuring cocoons, and the offer of a bonus at the rate of Rs. 5 for every thousand disease-free layings prepared and distributed for two years and at half the rate for the following three years. Subject to the conditions prescribed aided grainages have been established as shown below and are now supplying more than half the cellular seed used in the State:—

TABLE XXVIII.

Year.	Number of aided grainages.	Number of layings supplied.
1927-28	2	2,000
1928-29	5	312,000
1929-30	11	710,546
1930-31	13	1,278,575
1931-32	16	1,524,178

Seed production by "selected rearers" in Mysore.

68. Another agency which assists in the supply of disease-free seed are sericultural co-operative societies, of which there are 22 working in the State, with a membership of about five hundred and a subscribed share capital of Rs. 2,500. In 1931-32 these societies prepared 143,460 layings for the use of their members. Finally the 'seed campaign', organised and supervised by State officials, is intended for the production of healthy seed cocoons on a large scale to assist in eliminating the risk of disease. It is

only meant to be a temporary measure, the ultimate object being a number of grainages sufficient to supply all the industrial seed that may be required. Under the conditions laid down for this campaign 518 seed rearers have been selected capable of producing about 700 lakhs of seed cocoons a year. These selected rearers must rear only cellular layings supplied free from a Government grainage; they must also submit to supervision and control. In addition to a free supply of seed, they get their houses disinfected free of charge, free microscopic examination of worms and moths, and assistance in the disposal of their cocoons. The number of seed cocoons put on the market under this scheme rose from 70 lakhs in 1924-25 to 250 lakhs in 1931-32. Here too seeing that the rearers already on the list can produce as much as 700 lakhs of cocoons, they should be encouraged to increase their production to the greatest extent possible. But it must always be remembered that the production and sale of seed cocoons can never be as safe a practice as the supply of disease-free seed; and for this reason the more satisfactory development would be the multiplication or extension of grainages.

Disease-free seed in Kollegal.

69. The percentage of disease-free seed distributed in the Kollegal taluk of Madras amounts, as we have seen, to no more than one-tenth of the quantity required. Yet in 1931-32 the Sericultural Officer in Kollegal failed to distribute even this limited quantity. For in the report of the Department of Industries for that year we find that out of seven consignments of seed cocoons sent from the farm at Hosur to the sericultural staff in Kollegal only two were used for seed purposes, the remaining five being disposed of for reeling purposes. In addition to making this inadequate supply of disease-free seed, the Madras Government employ what they call a Peripatetic Rearing Party at Kollegal, whose main duty it is to test moths for such rearers as express a wish to know whether their seed is free from disease. The Government of Madras are, however, seeking to encourage the use of disease-free seed by supplying it below the price of village seed; they hope to supply 50 per cent. of the total requirements next year and by gradual stages to replace village seed altogether. An attempt to introduce the Mysore system of 'aided grainages' proved a failure in Kollegal, partly owing to difficulty in procuring good seed cocoons and partly because the rearers would not pay their dues.

Cost of disease-free seed.

70. It must always be more expensive to buy disease-free seed than seed cocoons. This is especially noticeable in the case of a Government grainage where along with the actual preparation of disease-free seed, experiments in hybridisation, etc., are carried on, which involve the installation of a refrigerating plant and other expensive appliances. The standard cost of the seed imported every year to Kashmir and to the Punjab is Rs. 2-8 to Rs. 3 an ounce. The Kashmir State distributes all seed to the rearers free of cost, or in other words the seed remains the property of the State and is temporarily made over to the rearers for the purpose

of producing cocoons: in the Punjab the rearer is charged the cost price of the seed. In Bengal where, as we have seen, seed is always sold in the form of cocoons, the present price of ordinary seed cocoons is said to be Rs. 2 a seer—or Re. 1 a lb. The price of Government seed cocoons is generally fixed at double that of ordinary village cocoons. A seer or a *kahan* of seed cocoons is expected to give five hundred layings of eggs. In Mysore and Madras 1,000 seed cocoons which weigh about two pounds and should produce 300 layings or about $2\frac{1}{4}$ oz. seed, are sold for 12 annas or Re. 1. The cost of manufacturing disease-free seed in the Madras Government's farm at Hosur is about Rs. 1-10 per hundred layings; but the seed is sold to rearers at a concession rate of $5\frac{1}{3}$ annas per hundred layings. In Mysore also disease-free seed is sold from State grainages below cost price, as is shown by the following statement:—

TABLE XXIX.

Year.	Cost of production per ounce disease-free seed.	Sale price per ounce Mysore layings.	Sale price per ounce Cross-breed layings.
	Rs. A. P.	Rs. A. P.	Rs. A. P.
1925-26 . .	3 9 6	1 6 4*	1 6 4
1926-27 . .	2 15 7	1 6 4	1 6 4
1927-28 . .	2 15 6	1 6 4	1 6 4
1928-29 . .	2 13 8	1 6 4	2 1 7†
1929-30 . .	2 9 1	1 6 4	2 1 7
1930-31 . .	2 3 7	1 6 4	2 1 7
1931-32 . .	2 1 3	1 6 4	2 1 7

From November 1932 the sale price has been reduced to Rs. 1-0-9 per oz. (12 annas per 100 layings) for the Mysore seed and Rs. 1-12 per oz. (Rs. 1-4 per 100 layings) for cross-breeds. The cost of production in aided grainages is materially lower, though it is still higher than the sale prices fixed by the Government.

TABLE XXX.

Year.	Cost of production per ounce Mysore layings.	Sale price per ounce Mysore layings.
	Rs. A. P.	Rs. A. P.
1928-29 . .	1 8 9	1 6 4
1929-30 . .	1 7 3	1 6 4
1930-31 . .	1 3 4	1 0 9 to 1 6 4
1931-32 .	1 0 9	1 0 9

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* Re. 1 per 100 layings.
† Rs. 1-8 per 100 layings.

The prices at which the rearer can actually get his seed at the present time may be summarised as follows:—

TABLE XXXI.

Province or State.	Sale price per ounce.	Sale price per 100 layings (1 oz.= 140 layings).
Kashmir	No sale, the industry being a State monopoly.	
	Rs. A. P.	Rs. A. P.
Punjab	2 8 0	1 12 7
Bengal Government	......	0 12 10
Bengal, ordinary	......	0 5 4
Madras	......	0 5 4
Mysore, pure	......	0 12 0
Mysore, crossbreed	......	1 4 0

Legislation needed to compel the use of disease-free seed.

71. It is in our opinion necessary, if the industry is ever to become self-supporting, that the local Governments and States concerned should without delay undertake the operations necessary to provide a supply of disease-free seed sufficient to meet all demands. In Mysore, as we have seen in paragraph 67, energetic measures have been taken to increase the percentage of disease-free seed available for the rearers, and 27 per cent. of the seed requirements are now met either by disease-free cellular seed or by seed produced from disease-free seed cocoons, as compared with 8 per cent. eight years ago. Yet even in Mysore there is still a 30 per cent. wastage by the death of diseased worms before they spin cocoons. It is estimated that if all the seed used in the State were disease-free this wastage would be reduced to 15 per cent. By this means alone the yield of cocoons per acre would be raised by at least 20 per cent. with a corresponding increase in the yield of silk. To save this unnecessary loss all that is necessary is to provide a sufficient quantity of disease-free seed to meet the requirements of all rearers. These arrangements should be completed in a year and before the expiration of this period legislation should be passed making it a penal offence for anyone after a prescribed date to buy, sell or raise a crop from any seed other than that guaranteed to be disease-free. We recommend that, in order to secure uniformity of practice in all provinces and States, legislation should be undertaken by the Central Government and negotiations opened with the Mysore State with the object of simultaneously introducing identical regulations. Under the present constitution the Central Government can undertake legislation for the development of any industry which is by notification declared to be of public importance and we notice that in the proposals

contained in the White Paper on Indian Constitutional Reforms the same power is conferred upon the Federal Government. We should like to add that in our view it is an essential condition of the success of any such measures that the local administrations should arrange to make disease-free seed available to rearers at a price not exceeding the average charge now made for ordinary unprotected seed. Another way in which the use of disease-free seed can be encouraged is by reducing the rate of duty on imported seed which is all disease-free. We recommend that seed imported in the form of eggs be charged only 15 per cent. duty instead of the present rate of 25 per cent. inclusive of surcharge.

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CHAPTER VI.

Cocoon Production.

The rearing house and its equipment.

72. The raw material from which silk is derived is the cocoon spun by the silkworm; and the sole object of rearing the silkworm is the production of the cocoons. The production of cocoons is essentially a cottage industry ancillary to agriculture. The silkworm during its larval stage must be fed on mulberry leaf, which is an agricultural product; and it requires such constant attention that it can only be reared successfully in a cottage where people are present all the time and able to render the various services needed at frequent intervals throughout the day and night. In all parts of the country where sericulture is practised, the worms are reared in a room or in a verandah of the rearer's dwelling house. We are informed that the same practice is followed in other countries; in France and Italy, for example, the silkworms are reared in spring or early summer in a room which throughout the winter has been occupied by the farm animals. It is only on Government farms that buildings are constructed for the special purpose of rearing silkworms. The conditions necessary for the successful rearing of worms are an equable temperature, good ventilation and freedom from damp, draughts, and hot sunlight. In the early stages of the worm's existence the most important consideration is an equable temperature; but as it develops greater importance attaches to the provision of adequate ventilation. In Kashmir and the Punjab it is the common practice to rear the worms on mats spread on the floor of the room. In Bengal, Mysore and Kollegal the worms are reared in bamboo trays arranged on stands. The stand, as a rule, is five or six feet high, and in order to admit the free passage of air there should be a space of ten inches to a foot between each tray. The trays used in India are always round and vary in size from three to six feet in diameter. The other appliances required in the rearing house are a chopping board and knives to prepare the mulberry leaf, and the cocoonage or frame upon which the ripe worms are placed to spin their cocoons. The ideal rearing house would also contain a thermometer and hygrometer to enable the rearer to watch its temperature and humidity, as also nets for use in changing the beds, feathers to brush the newly-hatched worms, baskets in which to store the leaf intended for food for the worms, and disinfectants. But these comparatively elaborate arrangements are beyond the capacity of most rearers, and in the majority of cases the rearing house contains nothing but the stands and trays and knives to cut the leaf. In Kashmir and the Punjab artificial heat is required to produce a temperature high enough for the incubation of the seed; but no heat is employed for any of the operations in Bengal or Mysore.

Temperature and humidity.

73. The most suitable temperature for the rearing of silkworms is said to be between 70° and 80° F. But the Government of Bengal observe that " silkworms thrive quite well during October to April in the silk districts in Bengal with the room temperature varying from 100° F. (maximum) to 54°F. (minimum) ". This is in some measure confirmed by the results of an experiment in rearing worms in the hot climate of Madras. It is considered in Mysore that a suitably high temperature makes development rapid and healthy, causing all the organs to function vigorously, stimulating the appetite for food, and thus encouraging the building of more body tissue. A low temperature on the other hand retards growth, dulls the bodily functions and lessens the consumption of food. Too high a temperature is undesirable, because it makes the organs function so quickly that the worm has insufficient time for full and healthy growth; moreover it destroys uniformity, causing the weak worm to suffer more than the stronger and accentuating the differences between them. No less important than temperature is humidity. For silkworms can bear a higher temperature when the air is dry than when it is damp. Humidity influences the worms' health as temperature influences their development. Too little humidity causes the mulberry leaf to dry up and wither and destroys its food value. Too much himidity favours the growth of the germs of disease, and when combined with a high temperature makes successful rearing extremely difficult. Air is necessary to the well-being of silkworms; they must not be crowded too close together; and the room in which they are kept must be well ventilated. To maintain the worms in health and to prevent the occurrence of disease it is also recommended that the rearing houses should be kept perfectly clean and that they should be periodically disinfected. The disinfectant recommended for use in Mysore is formaldehyde, which is neither dangerous nor expensive. In Kashmir the State undertakes the disinfection of the rearing houses in their seed production area; and a similar concession is allowed to the " selected rearers " in Mysore.

Purchase of seed.

74. In Kashmir and the Punjab the rearer is supplied with layings of seed which have to be incubated for a week to ten days before the worms hatch out. In Bengal the universal practice is for the rearer to buy seed cocoons. In this case the rearer collects his own seed from the layings of the moths which emerge from the seed cocoons and then proceeds in the same manner as if he had bought layings of seed. In Mysore and Madras the majority of rearers buy seed cocoons from seed production areas of established reputation. A minority buy layings of seed from Government or aided grainages. And in Mysore some rearers follow a third practice: one man buys seed cocoons and from the seed he obtains from them raises a crop of worms, which he tends up to the time of the first or second moult, after which he distributes them to others to tend during the remaining stages. This practice has also been adopted by some of the sericultural co-operative societies. It possesses obvious

advantages; the purchase of seed cocoons in larger quantities by a man with special knowledge and judgment of them, the rearing of young worms during their first two ages, when they need special care and attention, by a rearer who possesses special aptitude and skill, are two of the most important directions in which this practice contributes to economy and efficiency.

Incubation of seed.

75. When a rearer buys layings of seed or collects layings of seed from seed cocoons which he has bought, the first operation which engages his attention is the incubation of the seed. In Kashmir it is a common practice for three or four rearers to combine for the incubation of the five or six ounces of seed with which they have been supplied. The seed is partly prepared for incubation before it is distributed, and the rearer will have to look after it only for eight or ten days. The seed is placed on paper in a metal or stone bowl and covered to protect it from dust. It is then placed in a room heated by fire to a temperature which is maintained between 74° and 77°F. As the time for hatching approaches the temperature is raised to induce as far as possible a simultaneous hatching. Carelessness in regulating the temperature of the room leads to the loss of five or six per cent. of the brood. In the Punjab we are informed that the seed, which is distributed early in February every year, is hatched by the rearers " either by means of the heat of the body, or the fire ". In other parts of the country the problem is rather how to keep the temperature down than how to raise it. Thus the Mysore Government advise the selection of a room which should be kept as cool as possible; and its humidity should be increased if necessary by sprinkling water on the floor and walls or by placing a wet cloth near but not in contact with the eggs. It is most desirable that as many of the eggs as possible should hatch on one day; otherwise the rearing of two lots of worms hatched on successive days will deprive the rearer of the respite he would otherwise have during the moulting periods. It is possible to stimulate the eggs, by stroking them with a feather several times at intervals throughout the day before they are due to hatch, and so to ensure that about 95 per cent. of the eggs hatch on the same day. Another practice is to speed up the growth of the late hatched worms, by keeping them in a higher temperature and giving them more food, so that they catch up the earlier arrivals by the time they reach the third moult. After the worms are hatched the first operation to be performed is that of ' brushing ', or separating the newly-hatched worms from the shells of their eggs. The worms must be removed from the card or paper on which they have been hatched; this may be done either by tapping the card so as to shake the worm off, or by stroking the worms off with a feather. Another method is to place a thin cloth net or paper over the eggs with finely chopped mulberry leaf upon it; as soon as the worms are hatched they will crawl on to its under-surface when they can easily be collected for feeding. The first food given to the worm must consist of very tender leaves, not buds or half-opened leaves, chopped very fine.

Stages of the worm's development.

76. The silkworm's existence is divided into five 'ages' by the four occasions on which it moults: and in each age it is possible to observe five or six distinct periods in the worm's development. There is a period of hunger immediately after the worms are hatched or come out of moult, followed by a period of reduced appetite. In both these periods the worms are specially susceptible to disease and need special care in the selection of their food and in protection from draughts. The third period is one of greatly increased appetite. In the fourth the worm develops in thickness, having grown mainly in length in the previous stages, and is robust and vigorous. The fifth is the period immediately preceding the moult; the worm loses appetite and wants to rest. The sixth is the period of moulting, in which the worm breaks the old skin at the head and gradually wriggles out of it. The careful rearer will adapt his treatment of the worms not only to the age of the worm, but also to the particular period of its age. We have already noticed the importance of temperature, humidity, ventilation, and cleanness in the rearing house. Other important matters which engage the rearer's attention are the feeding of the worms, spacing them, and the cleaning or removal of litter from the bed.

Feeding.

77. Mulberry leaf must be gathered fresh every day, and the best time for doing so is in the evening when it is richest in food matter. The leaf may be gathered either by cutting branches, or by removing shoots, or by picking leaves separately. The cutting of branches is generally done once a year when the garden is pruned. In Bengal, however, we are told that leaves are gathered only for feeding in the first stage and that for all subsequent stages the feeding is done by spreading shoots with leaves on the trays. This is in accordance with the latest practice in Japan and saves some labour in removing the litter. The cutting of shoots involves less labour than picking individual leaves; but it is held in Mysore that the plant is liable to be damaged and leaves of all degrees of maturity are mixed together so that when plenty of labour can be procured at low cost it is preferable to pick the leaves separately. The practice, common in parts of Mysore, of cutting the plant down to the ground several times a year is wasteful; the size and quality of the leaves deteriorate, rendering the worms feeble and the cocoons poor. The leaf when picked is, as a rule, stored in the rearing house until it is required. Before the worms are fed, the leaves should be cut to sizes appropriate to the condition and size of the worms. During their five ages the worms grow very rapidly, the weight of a full grown worm being between 7,000 and 10,000 times what it was when newly hatched. During their first age the young worms develop from fourteen to fifteen times their original weight; and though they spend a comparatively small part of their time feeding they require a very large quantity of food. The weight of leaf required for food is roughly two-and-a-half times the increase in weight in each age from the first to the fourth and about four-and-a-half times the increase of weight in the fifth age. The increase

Cleaning.

78. Since an unclean bed rapidly becomes full of disease germs, it is most important that the unused food together with the excreta passed by the worms should be removed periodically. The quantity of food left uneaten is considerable:—

TABLE XXXIII.

Age.	Percentage of total food remaining unconsumed.
1st	80 to 90 per cent.
2nd	70 „
3rd	60 to 65 „
4th	40 to 50 „
5th	30 to 35 „

The droppings amount to a gradually increasing proportion of the weight of food eaten, and on the average will be not less than three-fifths of the total weight taken in. It is desirable to clean the bed as frequently as circumstances permit. The limiting factors are, first, the labour involved, and secondly, the risk of losing worms. During the first age the quantity of leaf fed is small and the worms being very tiny are most apt to be lost; cleaning should, therefore, be done only at longish intervals. The bed should always be cleaned just as the worms are preparing to go into moult, for the reasons that a damp bed delays moulting and that the worms' vitality is at its lowest immediately after the moult when it is, therefore, important to protect them as much as possible from the risks of disease. In the first age it will suffice to give one cleaning two or three days after hatching and one just before the first moult. In the second age three cleanings should be given, in the third and fourth four each, while in the fifth age the quantity of food given is so great that the bed should be cleaned twice a day. The usual method of cleaning is either with husk or with a net or with the two combined. By the first method a thin layer of husk is sprinkled evenly over the whole bed; food is placed on the husk and the worms come up through the husk to eat. They can then be swept up and collected. If a net is used, it is placed over the bed, food is placed on it and the worms rise through the meshes of the net which can then be removed to a fresh tray. The first method involves more work, but is more effective; the use of both husk and net combines the cleanness of the husk with the convenience of the net, but is more expensive.

79. We have already seen that a silkworm by the end of the fifth age will weigh from 7,000 to 10,000 times as much as when newly hatched. There is a corresponding increase in size:—

Spacing.

TABLE XXXIV.

Age.	Increase in length.	Increase in girth.
End of—		
1st Age . .	2½ times the length of newly hatched worm.	More than twice the breadth of newly hatched worm.
2nd ,, . .	4 to 5 ,,	Nearly 4 times the breadth of newly hatched worm.
3rd ,, . .	7 to 10 ,,	6 to 7 ,,
4th ,, . .	13 to 15 ,,	10 to 13 ,,
5th ,, . .	23 to 27 ,,	17 to 22 ,,

Worms need more space than that which they actually cover; for they have to breathe and move about. The following Table shows for the Mysore race of silkworms the space required in the seasons of greatest and lowest development:—

TABLE XXXV.

Space required for 100 layings.

Age.	Period.	Greatest development.	Lowest development.
		Sq. ft.	Sq. ft.
1st	Beginning	2½	1½
	End	12½	7½
2nd	Beginning	12½	7½
	End	25	15
3rd	Beginning	25	15
	End	50	30
4th	Beginning	50	30
	End	125	75
5th	Beginning	125	75
	End	250	150

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The development of the worms is most rapid in their first age, when it is necessary to space them every day until they show signs of going into moult. In each of the ages from the second to the fourth three spacings should be given. In the fifth age two spacings will be sufficient. Spacing is most conveniently done in conjunction with cleaning, by distributing the worms, as they are taken from their old bed, evenly over a new bed of the required size. When spacing has to be done independently of cleaning, it is necessary to pick out worms from the parts of the bed where they are thickest, so as to effect an even distribution over the whole of the enlarged space.

The spinning of the cocoon.

80. At the end of the fifth age the worms shrink in length and appear round in shape; they turn a yellowish colour; they lose their appetite and begin to look about as though seeking for a suitable place to which to attach themselves; and they begin to discharge silk. These are the signs of 'ripeness'; and it is time to 'mount' such worms on the cocoonage where they are to spin their cocoons. The form of cocoonage in common use in all parts of India except Kashmir, is the 'chandrika', a rectangular bamboo mat fitted with a spiral of bamboo tape. In Kashmir branches of mulberry trees are arranged one above the other to afford the support necessary for the silkworms in spinning cocoons. It is important neither to allow worms to get over-ripe before mounting them in which case they will waste some of their silk, nor to move them to the cocoonage before they are fully ripe, when they are liable either to fall off or to spoil other cocoons. The rearer must therefore be ready to pick up individual worms as they ripen without waiting for the whole tray to become ripe. The cocoonage must not be too crowded; some varieties of worms if placed too close together are apt to spin double cocoons and to spoil the cocoons spun by other worms. Moreover overcrowding hampers ventilation and will result in the production of damp, stained and inferior cocoons. While spinning cocoons worms require a slightly higher temperature than during rearing: the air should be dry: ventilation should be free; but there should be no violent draughts. We have described in Chapter III the manner in which the worm spins the cocoon. The operation may be completed in a day; and in about one day more the larval skin is cast leaving the pupa soft and flabby. The cocoon should not be harvested while the pupa skin is so soft that it is liable to break and stain the inside of the cocoon with blood. On the other hand to delay the harvest means loss by the reduction in the weight of the cocoon, and inconvenience in the curtailment of the period for transport and stifling. The best time to harvest is when the pupa begins to turn brown and to harden, which occurs about six days after mounting in a temperature of 70° to 75° F., or in higher temperatures one, two or even three days earlier. The harvest is the most convenient occasion to sort the cocoons; but under present conditions this is not systematically practised in any part of India. Indeed some witnesses have denied that any sorting is done at all, though we have received a certain amount of evidence that the practice is known in Bengal, of which further proof is found in the regular quotation of maximum and minimum prices for cocoons. The rearer often sells defective cocoons along with good ones: and in consequence gets a lower price from the reeler. We have been informed that about 2½ per cent. of the cocoons bought by a filature in the Mysore State are unreelable. It is a matter for consideration whether the rearer would not secure a better price if he separated the good from the defective cocoons, instead of selling them all together.

Stifling or conditioning the cocoons.

81. It is reported that both in the Punjab and in Bengal it is the common practice for the rearer to sell his cocoons ' dry ', *i.e.*, after he has killed the pupa by exposing the cocoon to the heat of the sun. Some rearers in Kashmir follow the same practice. But the more common practice in Kashmir and the almost universal practice in Mysore and Kollegal is for the rearer to sell the cocoons ' green '. The Kashmir cocoon, until the larva is transformed into the pupa, contains 75 per cent. moisture; and even after the pupa is formed the moisture content is 66 per cent. Hence in Kashmir the proportion of ' green ' cocoons to ' dry ' is three to one and this proportion is normal in all parts of India. The ' stifling ' of the cocoon by exposure to the heat of the sun is not such an effective method as steaming the cocoon or application of the " hot air " method for reasons explained in paragraph 86; and where transport facilities permit and the rearer is sure of his market he prefers to sell his cocoons green. But when there is a risk of the moth piercing the cocoon before he can sell it, it is obviously necessary for him to stifle the cocoon himself and sell it dry.

Yield of cocoons.

82. In comparison with European countries the yield of cocoons obtained in India even from univoltine worms is low. The yield of cocoons per ounce of silkworm seed used is reported as follows from various parts of the country:—

TABLE XXXVI.

Province or State.	Yield of cocoons per unce of seed.
	lbs.
Kashmir	84
Jammu	86
Punjab	14 to 20
Bengal	48
Madras	60
Mysore	50

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There seems to be a mistake in the figures given for the Punjab; but the sericultural industry in that province is so small and unimportant that their figures do not materially influence our conclusions. It is the yield reported from Kashmir and Jammu which we should have expected to approximate in some measure to that of European countries. But as compared with yields of 84 to 86 lbs. reported from Kashmir and Jammu, we are told that in France yields of about 100 lbs. are not uncommon and in Italy 120 lbs. is not considered exceptional. It is necessary to give some explanation of the figure shown against Mysore. In their first memorandum on the sericultural industry of the Mysore State the Mysore Government reported the yield of cocoons from the 6,000 lbs. of leaf grown on one acre of unirrigated mulberry land to be on the average 375 lbs. *if all the crops are successful.* In the same memorandum they stated that "generally about 140 Mysore layings weigh one ounce. These produce about 27,500 cocoons or 50 lbs. of cocoons". In another memorandum on the development of sericulture in Mysore, prepared about the same time, they say that the Mysore rearer "loses or used to lose about two of these (six) crops owing to bad seed or inadequate knowledge and resources"; and in another paragraph of this memorandum they say: "fifteen years ago, 25 to 30 lbs. was considered a fair yield for a rearing with 100 layings. The present average is somewhere about 40 lbs. in areas influenced by the new organisations". A yield of 40 lbs. from 100 layings is equivalent to 56 lbs. from 140 layings or one ounce of seed. But in their replies to our questionnaire the Mysore Government have given the total yield of cocoons in 1931-32 as 96·20 lakhs from 37,000 acres under mulberry, which gives an average yield per acre of 260 lbs. In their oral examination the representatives of the Mysore Government maintained that the average yield which they obtain is only 260 lbs. an acre; and that the yield of 375 lbs. which they inserted in their original memorandum represents an ideal which they hope to work up to but have not yet achieved. We notice, however, that throughout their memoranda and evidence the Mysore Government have assumed that the cost of cocoons is 5 annas a lb. Now 5 annas a pound is the cost worked out on their data at a yield of 375 lbs. to the acre. If the yield for an acre is only 260 lbs. then on the data used the cost of cocoons works out at 7 annas a pound. In Chapter XIII we discuss the cost of producing cocoons and explain why we have come to the conclusion that it is below rather than above 5 annas a lb. Moreover we believe that an estimate of the average yield of cocoons from a given quantity of seed or from a given area of mulberry, is much more likely to be accurate than one calculated from the total acreage under mulberry and the total quantity of silk produced in the State. We, therefore, consider that in Mysore the average yield of cocoons from an ounce of seed is much more likely to be 50 lbs. as stated in their first memorandum than 35 lbs. as may be deduced from their answer to our questionnaire.

Consumption of mulberry leaf per pound of cocoon.

83. Further light is thrown on the practice of cocoon production in India by consideration of the consumption of mulberry leaf per pound of cocoons produced.

TABLE XXXVII.

Consumption of mulberry leaf per pound of cocoons produced.

Province or State.	Pounds.
Kashmir	24
Jammu	23
Punjab	102
Bengal	25
Madras	16⅔
Mysore	16

Here again the Punjab figures are vitiated apparently by the erroneous statement regarding the yield of cocoons from an ounce of seed. Compared with European standards the consumption of leaf in Kashmir and Bengal seems high. This no doubt is partly due to the cheapness of mulberry leaf in Kashmir and to the fact that in Bengal twigs are weighed with the leaves; but it is also due in part to the comparatively low yield of cocoons per ounce of seed.

Prices of cocoons.

84. We have now to consider the prices which the rearer is able to get for his cocoons; and here we suffer from the handicap of the absence of a regular cocoon market. Nor is a record of prices maintained by any public body except the Mysore Silk Association, who have kept a regular record only since March, 1931. In support of their claim for protection the Bengal and the Mysore Governments have supplied us with the average prices of cocoons from 1924-25 to 1932-33.

TABLE XXXVIII.

Price per pound of cocoons.

	Bengal.				Mysore.	
	Maximum.		Minimum.		Average.	
	As.	P.	As.	P.	As.	P.
1923-24	12	6	11	0	—	
1924-25	11	1½	8	9	10	2
1925-26	9	4½	8	0	9	8
1926-27	9	7½	7	7½	9	6
1927-28	9	4½	7	3	9	3
1928-29	8	7½	6	0	8	3
1929-30	8	0	5	3	7	6
1930-31	5	7½	3	1½	4	7
1931-32	4	9	3	1½	5	0
1932-33	8	0	4	4½	4	10

We are frankly unable to accept the Bengal prices for 1932-33 r we do not believe that a price of 8 annas a pound can have been ained for cocoons so recently. It will be noticed that there was teady decline from 1923 to 1929-30 and that in 1930-31 prices ddenly collapsed by 30 or 40 per cent., reflecting the conditions ich we have described in Chapter II. The rise shown in the sore prices of 1931-32 was brought about by England's departure m the gold standard in September 1931. We have also been pplied with some evidence regarding the price of cocoons in sore as far back as 1916; and with this information we have enavoured to compile a series of Index Numbers for cocoons to come with the Index Numbers of prices of other agricultural prots and of raw silk which has been supplied to us for the Bangae market. The price of cocoons in 1916 was 8½ annas a pound and t of raw silk was Rs. 7-2-0. In 1914 the price of raw silk was 7-14-0 a pound and a corresponding addition to the price of cocoons would give them a price of Re. 0-9-3½ in that year. Taking this price as 100, we find that the course of prices from 1914 onwards is as follows:—

TABLE XXXIX.

	Price of cocoons per lb.				Index number.
	A. P.		A. P.		
1914	9 3½			=	100
1916	8 6			=	91
1920	14 9	to	15 6	=	159 to 167
1922	14 0	to	15 0	=	151 to 162
1923	12 0	to	14 0	=	129 to 151
1924	10 0	to	11 0	=	108 to 118
1925	9 8			=	104
1926	9 6			=	102
1927	9 3			=	100
1928	8 0	to	8 3	=	86 to 89
1929	7 0	to	8 0	=	75 to 86
1930	5 0	to	6 0	=	54 to 65
1931	5 0	to	5 6	=	54 to 59
1932	4 6	to	5 0	=	48 to 54

The post-war boom lasted till 1922; by 1927 prices had reached the pre-war level; and since 1928 there has been a steady fall to the present price which is about fifty points below that of 1914. From the following statement, however, which shows the Index Numbers of the prices of the principal agricultural products along with those for cocoons and raw silk from 1926 onwards, it will be seen that the fall in the price of food crops other than rice has been greater than the fall in the price either of cocoons or of raw silk.

TABLE XL.

Index Numbers of wholesale prices at Bangalore of selected articles—1926-32, 1914 price = 100.

	Rice.	Ragi.	Javari.	Ground-nut.	Co-coons.	Raw Silk.
1926	150	188	140	181	102	117
1927	149	184	156	205	100	119
1928	144	184	148	215	87	110
1929	140	179	139	143	81	103
1930	118	124	107	107	59	84
1931	89	77	74	66	56	70
1932	90	102	72	79	51	74
1933 (Jan.) .	85	79	63	91	54	62
Percentage of fall—						
1926-1933 . .	43	58	55	50	47	47

The comparative course of prices as shown by this statement indicates that the fall in the price of cocoons and raw silk, serious though it has been, has been exceeded by that of the food crops other than rice, and it may be inferred that there has consequently been little or no inducement to the cultivator to substitute one of the other crops for his mulberry. A similar conclusion is suggested by the fact that the fall in the price of Bengal silk between 1926 and 1932 was only 35 per cent. as compared with a fall of 62½ per cent. in the price of jute. Some mulberry land has gone out of cultivation—partly land cultivated by hired labour which is comparatively expensive, and partly irrigated land where alternative crops such as vegetables and sugarcane pay better.

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CHAPTER VII.

Reeling.

The operation of reeling.

85. The cocoon consists of (1) an outer covering of loose fibre or 'floss', (2) a continuous thread of silk fibre and (3) an inner parchment-like shell, which immediately surrounds the pupa. The operation of reeling consists of separating the continuous thread from the other two parts of the cocoon, joining together the continuous threads from a sufficient number of cocoons to give a combined thread of the desired thickness or 'denier' and the winding of the combined thread off on to a reel. The cocoon of the eri silkworm is so soft that the thread cannot be drawn off continuously, and must therefore be spun like cotton; but in the case of all other silk cocoons the operation of reeling is essential to the production of the raw silk of commerce. Reeling may be done by hand, or by power-driven machinery; and India to-day affords examples of every stage of development. In Bengal and Mysore as also in Madras, Assam, Bihar and Orissa and the Punjab, most of the reeling is done by hand, sometimes as a genuine cottage industry on single 'charkhas' and sometimes concentrated in centres where a number of 'charkhas' are worked under the supervision of a master reeler. The Mysore Government have a small power-driven factory or filature at Mysore, which is little more than a demonstration plant for the instruction of students of this industry; there is a small filature in Bangalore and another at Kollegal in the Madras Presidency both owned by the same proprietor; and in Kashmir and Jammu all reeling is done in four filatures at Srinagar and one at Jammu; while a second filature at Jammu is ready to start work as soon as the conditions of the trade justify an increase in production. The Governments of Madras and Mysore have been trying to devise means of improving the country charkha; in Mysore an improved type of hand-driven charkha has been on the market for the last five years; but the type favoured in Madras has not yet been tried out on a commercial scale. In this chapter we shall first describe the operation of reeling by hand, as practised on contrivances of the traditional type. We shall then examine the improved types of hand-driven machines and consider how far they are likely to prove economical; and finally we shall consider the working of the filatures. In each case it will be necessary, in order to form our conclusions regarding the relative merits of the various contrivances, to study the quantity and quality of the production as well as its cost; but we postpone our examination of costs to Chapter XIII.

Conditioning or stifling the cocoons.

86. The first operation to engage the attention of the reeler is the 'conditioning' or 'stifling' of the cocoons, if this has not already been done by the rearer. The object of this operation is to kill the pupa; for if it is not killed, it will in due course change

into a moth and force its way out of the cocoon, breaking as it does so the continuous thread of silk fibre and thus rendering the cocoon unreelable. It is not the practice anywhere in India to reel the silk from the cocoon while the pupa is still alive. To this custom which is or was prevalent in parts of China is ascribed in some measure the superior quality of much of the Chinese silk. Ordinarily in villages cocoons are stifled by exposure to the sun. In Mysore it is the common practice to fill a bamboo basket holding 25 to 30 lbs. of cocoons and keep it for forty minutes or so on the top of the reeling basin filled with boiling water. Where steam or hot air can be applied these methods are the most effective. At the Bangalore filature cocoons are conditioned by insertion for about half an hour in an air-tight chamber filled with steam; they are then dried in the open air; and with proper care and frequent change of position, they can then be kept without damage for months. In cocoons which have been stifled in the sun or by the less efficient method of steaming reported from Mysore the pupa not having been thoroughly dried retains a lot of moisture and is liable if kept for more than a few days to rot and discolour the inner layer of the cocoon. These cocoons should not therefore be kept for more than ten or fifteen days before they are reeled.

Sorting of the cocoons.

87. Another operation preliminary to the process of reeling proper is the sorting of the cocoons. This however is treated seriously only in Kashmir and Jammu, where different qualities of raw silk are manufactured, distinguished by definite trade marks with which their customers are thoroughly familiar. To preserve the standard characteristics of each sort it is necessary to make a careful selection of cocoons with reference to the particular quality which is to be manufactured. We have evidence that sorting is practised to some extent in Bengal and we have reason to believe that it is followed in Mysore too. But in these areas the question of sorting has not assumed the same importance as in Kashmir where it became necessary on account of the considerable export business.

Processes involved in reeling.

88. The process of reeling consists first of the soaking of the cocoons in hot water, and brushing them so as to loosen the outer fibres; secondly, the purging or removal of the outer floss; thirdly, the passing of the fibre end of each cocoon, in conjunction with such number of other ends as may be necessary to produce raw silk of the thickness or denier required, through the eye or 'jettebout' by which the fibres are consolidated together to form the thread; fourthly, the croisure in which the thread is twisted either against itself or against another thread in order further to consolidate the several fibres of which each thread is composed; and fifthly, the winding of the thread on to the reel. In some form or other each of these operations is performed, whether the reeling is done on a hand-driven or on a power-driven contrivance. In the case of the ordinary hand-driven charkha, the cooking of the cocoons, the

brushing of them and the removal of the outer floss are all done in the same receptacle as that in which the cocoons remain while their threads are being unwound. In the common charkha of Mysore the ' ends ' are passed through holes in a strip of bamboo. In the Bengal ' Ghai ', which embodies some of the improvements introduced by the East India Company, the holes are sometimes bored in an iron plate, or sometimes they are in a porcelain button which is fixed to the iron plate. Having passed through the eye each thread is twisted a few times against another thread, which has been passed through a similar hole in an adjacent part of the bamboo or iron plate, and is then led through wire guides to the reel on to which it is wound. Uniformity should be secured by seeing that the thread consists of the same number of ends throughout; and this involves stopping the winding operation whenever the ends break. The daily production of raw silk attainable on the country charkha naturally varies according to the denier of the silk produced and the care taken in the process. From a pound to a pound and a half will generally be considered a reasonably good day's work.

The 'rendita'.

89. The efficiency of the reeling operations are to some extent indicated by the ' rendita ', a term used to express the quantity of cocoons required to produce a pound of raw silk. In addition to the silk fibre the cocoon contains a considerable quantity of gum; and it should be the object of the good reeler, by the use of clean water heated to a suitable temperature and by the pressure exerted by a proper ' croisure ' of the thread, to extract as large a quantity as possible of the gum, leaving nothing but the pure silk fibre on the reel. The chief difference between silk reeled in a power-driven filature and that reeled on a hand-driven ' charkha ' is that the arrangements in the filature result in the removal of much more gum than can be managed in the conditions under which the hand-driven charkha is worked. Thus in Mysore the Government filature is reputed to use nineteen pounds of cocoons to produce a pound of silk, and the Bangalore and Kollegal filatures from fifteen and a half to seventeen and a half pounds; while on the ordinary charkha a pound of silk can be reeled from thirteen pounds of cocoons or less. It is evident that the greater the quantity of gum and waste which is allowed to remain attached to the silk fibre, the greater will be the weight of the silk, and consequently the less will be the quantity of cocoons required to produce a given weight of silk. On the other hand to leave much gum and waste attached to the silk impairs its quality and lowers its value. Since the value of the cocoons used represents approximately eighty per cent. of the value of raw silk reeled upon a charkha, it is clear that the ' rendita ' has a most important influence on the cost of reeling. The variation in the prices quoted for raw silk reeled on country charkhas must in the main represent a variation in the ' rendita ' though we believe that the prices are also affected to some extent by differences in the price paid for cocoons and in reeling costs.

Defects of charkha reeling.

90. We now proceed to examine the defects which are manifest in the process of reeling by hand, as commonly practised in the villages of Bengal and Mysore. In the first place there is only one basin of water in which the cooking, brushing and purging of the cocoons as well as the actual reeling are performed. This defect has two bad results. While the water is not hot enough for good cooking, it is much too hot for good reeling: it deadens the sensitiveness of the reeler's finger tips so that he cannot feel how many cocoon ends he is reeling at a time; nor can he see because of the steam rising from the basin. Further the presence of all the waste in the water makes it very dirty and much of the dirt and gum adhere to the silk thread and make it harsh and sticky. Secondly, the 'croisure' is insufficient; in filatures and on the improved hand reels the silk thread is twisted upon itself several hundred times so that the two fibres which form each end and the several ends which are combined to form the thread are all consolidated and pressed together into a clean thread of compact shape and uniform size, while as much as possible the gum is squeezed out of the fibre; on the ordinary country charkha each thread is generally crossed not on itself but on another thread and only for a very few—less than a dozen times. Thus the thread reeled on the charkha is not properly consolidated, and the gum is not thoroughly extracted. A third defect is that the reeling tends to be done too fast and is jerky, not being subject to a steady uniform pull; and this inequality of pull means that the thread is not uniform in size—thin when the reel turns fast and thicker as the pressure is relaxed; further when there is a break some little time must elapse before the reel is stopped and more often than not the break is left unmended. All these defects impair what are termed the 'winding' quality of the silk making it difficult to handle in the throwing mill or by the weaver.

The Mysore Domestic Basin and the Madras Improved Charkha.

91. A consideration of these defects led to the design and patenting by Mr. N. Rama Rao, *ex*-Director of Industries and Commerce in Mysore, of the Mysore Domestic Basin. Different basins are provided for cooking and reeling. Jettebouts are fitted, instead of fixed eyes, to catch the cocoon ends and join them into a single thread. By a system of pulleys each thread is given a proper 'croisure' over itself a sufficient number of times to be really effective, before it is wound on to the reel. The fly wheel, though it is turned by hand, is fitted with gearing which helps to render its speed uniform. This Domestic Basin can be run either as a single unit, as a double unit or as a five basin unit. The five basin unit is the most economical: for one turner can operate the whole unit. On the technical side these basins mark a great advance on the ordinary charkha, and the silk reeled on them is nearly as good as filature silk, and commands a price higher than that of charkha reeled silk. But it is an expensive plant to instal and not cheap to run; a single unit costs Rs. 200 a double unit Rs. 350 and a five basin unit Rs. 800. And though the Mysore Government has fixed concession rates of Rs. 130, Rs. 250 and

Rs. 600, and offers to collect these reduced charges by instalments, the number of basins installed has only risen from 26 in 1927-28 to 133 in 1931-32; of the 133 basins installed in June 1932, 120 were in five basin units. The Mysore Silk Association quotes in March, 1933, a price of Rs. 7-8-0 a pound for Domestic Basin silk, while the highest quotation for charkha silk in that month is Rs. 6. And the Mysore Government give the price of producing silk on a five basin unit at Rs. 7-14-0 a pound as compared with Rs. 6 a pound for charkha silk. We notice however that the Mysore Government base their estimate on a 'rendita' of twenty pounds of cocoons to a pound of silk. We have received statements of cost from two private owners of Domestic Basins, each of whom quotes a rendita of eighteen pounds of cocoons. At this rendita the cost of production would be Rs. 7-4-0 a pound. Even this is too high a price for the purchasing power of the ordinary weaver and the want of a market is probably the chief reason why the Domestic Basin is not more popular. In this respect and also in respect of the initial cost the experiments which are being made in Madras are encouraging; for the improved charkha which is being tried in Madras costs only Rs. 50 to make; it is being worked at a rendita of 16 pounds of cocoons to a pound of silk; and its cost of production is given as Rs. 6·2 or Rs. 6·3 a pound of silk. But these are the results of only two days' working in the Textile Institute in Madras; and it remains to be seen how this improved charkha stands the test of commercial operation in a village. It evidently deserves a thorough trial.

Capacity and Production of filatures.

92. We now turn to the power-driven filatures, the capacity and output of which are as shown below:—

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TABLE XLI.

	Number of basins.	Capacity lbs. Raw Silk.	Output in 1931-32. lbs. Raw Silk.
Kashmir	992	400,000	198,485
Jammu*	190	80,000	31,805
Bangalore	40	15,000	—
Kollegal	40	15,000	3,027
Mysore Government .	18	6,750	3,152

The wide margin between the capacity of the filatures and their output in 1931-32 is explained as follows. In Kashmir the variation is due to the fact that the filatures are working short hours and that the machinery is not being worked to full capacity. In Jammu a filature newly erected about two years ago has not yet been operated, on account of the lack of demand for the silk; the one filature that is working produced in 1931-32 about three fourths of its full capacity. In 1931-32 the filature in Bangalore was not worked at all; and the Kollegal filature produced only 3,027 lbs. of silk against a capacity of about 15,000 lbs. The short outturn in 1931-32 is a direct consequence of a decline in the demand for silk of the quality and price produced in the filatures. The Mysore filature is run rather as an experimental or demonstration factory than on a commercial basis.

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* These figures include a filature of 96 basins which has been completed but has not worked.

Filature processes.

93. The machinery in the Kashmir, Jammu, Bangalore and Kollegal filatures is all of the Italian type; that in the Mysore filature is French. There is however no essential difference between the Italian and French type of machinery. Two of the Kashmir filatures are equipped with Italian machinery of the most modern type imported in 1925 and 1927. The other two are equipped with locally made machinery of the Button type. One of the Jammu filatures is equipped with machinery of local manufacture. The machinery used in the Mysore, Bangalore and Kollegal filatures is all imported. The power for turning the reels is electric except in Kollegal where it is generated by steam. The water in the cooking and reeling basins is heated by steam. The first process is the cooking of the cocoons in boiling water in order to soften the gum; this takes a few minutes; and the cocoons are next brushed with a fibre brush, which removes the coarse outer layers of silk and permits the true end of the cocoon to be found. In the new Kashmir filatures these brushes work automatically. In the purging basin which may or may not be the same as the cooking basin the waste is removed, and the cocoons are then placed in the reeling basin. Over each reeling basin are fitted from four to eight jettebouts (in the modern filature) or porcelain buttons (in the older filatures) through each of which the reeler passes the fibres from 4, 6, 8, 10 or more cocoons, as may be required to produce raw silk of the denier which is being manufactured. Opinions differ as to the most economical number of 'ends' to be entrusted to each reeler. There is obviously a saving in entrusting eight ends to one man. On the other hand an eight skein reeler is paid higher wages, and we have received some evidence that in silk of the deniers commonly reeled in India it is only exceptional men who can be entrusted to reel more than four ends without a loss of quality. We have seen in paragraph 46 that the denier of the fibre as unwound from the cocoons produced in Kashmir varies from 2 to 3, while that of the Mysore cocoons ranges from $1\frac{1}{2}$ to $2\frac{1}{2}$. Thus to produce a raw silk of denier 13/15 from four to six Kashmir cocoons should be reeled together, and from five to eight of the Mysore cocoons. As they are drawn through the jettebout or button these gummy fibres are consolidated into one thread. This thread passes over two guide reels, is bent back and twisted over itself a number of times, in order to squeeze out the gum and moisture and to make the fibres more cohesive, and is finally passed over a third guide on to the "traveller or swift", which are names given to the reel on to which the silk is finally wound. The reeler's principal business is to keep a close watch on the cocoons in his basin, so that, as soon as the fibre from one cocoon breaks or is completely unreeled another fibre

may at once be joined up in its place. It is only by close attention to this matter that uniformity of size can be produced in the raw silk. After removal from the reel the silk is subjected to a close examination; and in the Kashmir filatures it is subjected to tests for evenness of size and cleanness, winding, tenacity and elasticity. After passing these tests the silk is folded and packed ready for despatch.

Locally made machinery.

94. We have seen that some of the machinery installed in the Kashmir and Jammu filatures is of local manufacture. The representatives of the State who gave evidence before us stated that it is impossible for the local manufacturer to produce such parts of the most modern machinery as jettebouts and automatic brushes, and that in so far as it lacks these refinements locally made machinery must suffer by comparison with that imported from abroad. On the other hand the Mysore Government in their small filature have installed a few basins, modelled on the Mysore Domestic Basin, and equipped with jettebouts. There is no doubt that the silk reeled by this machinery is of good quality. It is however impossible on the results obtained in the Mysore filature to decide how far its production is economical. The proprietor of the Bangalore filature is strongly of the opinion that machinery just as efficient as that imported from France or Italy can now be made in India and he estimates its cost at Rs. 100 a basin as compared with Rs. 400 or Rs. 500 which is the cost of the imported basin. We see no reason to discredit this evidence especially when we notice that China manufactures its own basins at a much lower cost; and indeed this confidence in the efficiency of locally made machinery is confirmed by the action of the Kashmir Durbar in equipping their newest filature in Jammu, completely with machinery of local manufacture. Of subsidiary machinery, such as motors, boilers, chimneys, shafting etc., all can be made locally except motors and perhaps boilers which are not made in India at present.

Power, Fuel and Water.

95. Both in Kashmir and in Mysore and Bangalore electric power is available and is used by the filatures. Power is supplied to the Kollegal filature by steam. Even where electric power is available steam is required to heat the water in the cooking and reeling basins. In Kashmir wood fuel is used. Power and fuel however constitute a very small part of the costs of reeling. Water is an item of more importance. A large quantity of water is consumed in the basins; and since the silk is sensitive to the chemical properties of the water, it is important that the quality of the water should be suitable; otherwise additional cost may have to be incurred in such preliminary treatment as is required to neutralise the effect of any deleterious properties it may contain. We have heard nothing to suggest that there has been any difficulty either in Kashmir or in Mysore in obtaining adequate supplies of water of suitable quality. Industrial concerns located in centres like Bangalore or Mysore have to incur a heavy charge of Re. 1 per thousand gallons if they take

water from a public authority. The Mysore filature finds it less expensive and more convenient to arrange for its own supply.

Labour.

96. There is no lack of labour. In Kashmir most of the work, which in all other countries is done by women and girls, is done by men and wages are consequently high.

TABLE XLII.

Wages of reelers.

	Kashmir.	Jammu.	
		Regular.	Irregular.
	Rs. A. P.	Rs. A. P.	Rs. A. P.
8 Skein reeler .	1 0 0 a day	1 2 0 a day	1 0 0 a day.
7 Skein reeler .	...	1 0 0 ,,	0 14 0 ,,
6 Skein reeler .	...	0 13 0 ,,	0 11 0 ,,
5 Skein reeler .	0 10 0 ,,	...	...

It is admitted that these rates are higher than the current rates paid in other industries, such as canvas and carpet making. But considerations inseparable from the working of a State monopoly make it difficult for the State to reduce them. A reeler can learn his work in a year, and other labour in three months or less; but even though he knows his work well the workman in Kashmir (Jammu is a little better in this respect) is apt to care only for his wages and to take little or no interest in his work. In Mysore most of the filature labour is female, and the complaint is that as they are mostly growing girls, it is difficult to keep them at work in the filature for any length of time. Without supervision they tend to become careless and fail to realise the need for conscientious work. Reelers in the Bangalore filature are paid from Rs. 6 to Rs. 10 a month. One test of the efficiency of labour is the daily output per head. We understand that in Italian filatures the daily production may vary from 200 to 600 grams per basin, or from about half a pound to a pound and a quarter. In four months of 1932-33 the Bangalore filature working to two-thirds capacity produced 2,841 lbs. of raw silk. On the assumption that two-thirds of the forty basins were working throughout the period, this output is at the rate of 27 lbs. per basin per month and must be deemed satisfactory. In Kashmir in 1931-32, 860 reelers produced 198,485 pounds of silk—an average of 230 pounds per reeler in the year; and in Jammu 90 reelers produced 31,805 pounds—at an average of 353 pounds per reeler. This great difference between the average output in Kashmir and that in Jammu is possibly due in part to the difference in the quality of the labour which we have mentioned above.

Silk Waste.

97. Besides the raw silk the waste has in normal times a commercial value, since it is sold as the raw material from which spun silk is manufactured. We have been informed that in Italy the production of waste may amount to anything between fifteen and a hundred per cent. of the

weight of silk reeled. In the Kashmir and Jammu filatures the production of waste is now about fifty per cent. of the production of silk; and in the Mysore filatures it is about seventy per cent. The waste produced in a filature consists mainly of the outer floss of the cocoon and also of the inner shell which immediately encloses the pupa and of the pupa itself.

Foreign supervision.

98. Except for three people—an Englishman and a Frenchman in the filature at Srinagar and a Japanese lady in the Government filature at Mysore—there is no foreign supervisory or managerial staff.

Quality of silk produced.

99. The silk produced from the Kashmir and Jammu filatures is generally superior. The Punjab Government report that, "from the manufacturing point of view the Indian silk as available in the Punjab (it comes almost entirely from Kashmir) compares favourably in colour, behaviour, and in winding qualities, with the imported silk, which has, however, the merit, which is a great consideration in these days of competition, of being cheaper"; and from the United Provinces Government we learn that in Benares, Kashmir yarn which was one time preferred for warp and formed about 20 per cent. of the total consumption of raw silk, has now been replaced by the cheaper imported silks. But the best testimony to the quality of the silk reeled in the Kashmir filatures is borne by certificates given by conditioning houses in Lyons and Milan. Five of these certificates, covering various consignments reeled in 1928-29, have been submitted to us, and we have been informed of the purport of about a hundred and seventy-five more. The winding quality satisfied the "extra good" test in 42 per cent. of these cases; in 18 per cent. of the cases it was "very good" and in 25 per cent. it was "good to fair"; uniformity and elasticity were generally satisfactory, and tenacity almost invariably good or very good. The Mysore Government have supplied us with a statement, which we reproduce below, in which they give the results of a series of comparative tests of Mysore Domestic Basin and filature silks and of competing Chinese silks, and show the great superiority of the Mysore silks. It must however be remembered that it is not the best Chinese silks which find their way to India. We have also been informed that the silk produced in the Bangalore and Kollegal filatures is of such a high quality as to have induced an American firm to offer to purchase 20,000 to 30,000 lbs. of these silks monthly.

Economical size for a filature in India.

100. We have been at some pains to form an opinion as to the most economical size for a filature working under Indian conditions. We understand that in Italy the number of basin in a filature varies from fifty to three hundred with an average of about eighty. In Japan there are filatures containing from four to fifteen hundred basins. Of the Kashmir filatures the two older ones contain about three hundred basins each, and each of the two modern ones has just under two hundred basins. The Jammu filatures have just short of a hundred basins each. The Bangalore and Kollegal filatures each have forty basins; and in the Mysore Government filature there are eighteen basins. The Kashmir Government with experience of the working of 100, 200 and 300 basins filatures state that "a filature of 100 basins constitutes a convenient unit for securing efficient production. If, however, one can work upto 200 basins results would be certainly better." They add that the newest private filatures in France and Italy contain between 60 and 90 basins. And in their oral evidence the Kashmir State representatives added that while a 200 basin filature would be very economical, an 100 basin filature would give greater efficiency; they would accept the Italian view that the larger the number of basins, the less close the supervision. The Mysore Government consider that "a filature with 72 basins (six ends) of the latest type with jettebout would be efficient and economic," adding that in France and Italy a 96 basin filature is considered economical, while in Japan the economical size for a filature is 150 basins (4 ends Button system). In South China the average number of basins in a filature is between 400 and 500, the lowest of which we have heard is 100; and the number may be as high as 760. We have also received from Mysore estimates for the future working of 72 and 200 basin filatures, while the Bangalore filature has given us an estimate for an 100 basin filature; Kashmir has sent us an estimate for a 200 basin filature and Madras for a 40 basin filature:—

TABLE XLV.

——	Cost of producing one pound raw silk in							
	40 Basin Filatures.		72 Basin Filatures.		100 Basin Filatures.		200 Basin Filatures.	
	Now	15 Years hence	Now	15 Years hence	Now	10 Years hence	Now	15 Years hence
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
Madras .	7 0 0	..	..	..	..	...	..	..
Kashmir .	..	..	..	..	..	..	9 1 10	..
Mysore .	..	..	7 2 1	4 12 0	..	..	7 9 5	4 12 2
Bangalore .	..	..	..	..	7 6 11	6 11 0	..	..

Except in the case of Kashmir these costs are all fair selling prices after making allowance for depreciation and interest on capital. They indicate that the Mysore Government, while they consider that at present a 72 basin filature is the more economical, think that in 15 years time there will be nothing to choose between a 72 basin and a 200 basin filature. From the evidence which we have received we are inclined to think that there are parts of the country where sufficient capital is forthcoming in which a 200 basin filature would be an economical size for India; where the capital and the market for high grade silk is limited or it is desired to modernise an existing establishment, a suitable size for a filature would be 100 basins or even less. We recognise the need for close supervision and the advantage enjoyed by a small filature in this respect. And we also recognise that the Indian market for silk of the quality produced in filatures is capable of expansion, and that there is a possibility of restoring the export business. In which case, the demand for filature silk will increase and the advantage may be with the larger filatures.

Possibility of increase in the number of filature.

101. We defer our consideration of the costs of reeling silk on the charkha and in filatures to a later Chapter. We find there that the costs of producing charkha silk may range from Rs. 4-13-5 to Rs. 6-2-6 according to the quality of the silk produced, while we put the cost of filature production at Rs. 6-10-9. A comparison of these figures suggests that the cost of producing the best quality charkha silk is much closer to that of producing filature silk than are the qualities of the silks produced. It would therefore seem that quality for quality filature production is more economical than charkha production. If this is observed even in the case of State managed filatures with their inevitably high charges as compared with a private enterprise, the question suggests itself why private enterprise has not been more attracted to the starting of filatures. To this question at least two answers might be given; in the first place the failure of the Bengal filatures to adopt modern processes was no encouragement to this branch of the industry; and secondly, the smallness of the Indian market for silk of the quality produced in filatures and the uncertainty of the demand from abroad, as witness the decline of the export trade from Kashmir, has limited the scope for filature reeling. If, as we believe, the future of the sericultural industry in India depends upon the establishment of more filatures, it appears to us to be no less certain that the establishment of filatures can only be justified by an increase in the number of mills requiring increased supplies of high class silks or producing European qualities of silks at such prices that they can compete in European and American markets.

CHAPTER VIII.

Subsequent processes: Re-reeling—Throwing.

1. Re-reeling.

102. We have seen that much of the silk reeled on country charkhas—over 80 per cent. of the silk produced in India—contains defects and blemishes which render it difficult for weavers to use until it has been subjected to a further process. Re-reeling is practised both in Japan and in China, partly in order to reel the silk into skeins of the standard size required by America, which is their principal market, and partly in order to provide an opportunity for removing the defects and blemishes left after the first reeling. In the filatures in India, both in Kashmir and in Bangalore, the close examination to which the silk is subjected after the reeling process is completed to some extent corresponds to this practice of re-reeling. The Mysore Government inform us that re-reeling of charkha silk is being carried on in some of the silk centres; and we are informed that in Bengal " at weaving centres re-reeling is done by women by crude methods ". The process consists simply of winding the silk from the skein as received from the reeler on to a reel and attending to any blemishes, or mending breaks and removing dirt which manifest themselves during the operation. In Bengal re-reeling is usually done by the women of the weaver's household free of charge; when a weaver has to get it done outside his own house the charge now is eight annas a seer, or four annas a pound. There is also a loss of weight which on the average comes to five tolas in the seer or 6¼ per cent. Thus the addition on account of re-reeling to the cost of a silk sold by a reeler at, say, Rs. 4-12 a pound will be four annas payment for the work together with four annas and nine pies on account of wastage. In Mysore we are informed that the charge for re-reeling is from eight to ten annas a pound; no distribution of the charge is made between labour and wastage. To make a fair comparison with the price of imported re-reeled silk, it would at first sight seem necessary to raise the fair selling price of Indian charkha silk by eight annas a pound. But we consider that by the process of re-reeling the Indian silk loses most of its inferiority in winding quality in which it is at a disadvantage as compared with imported silk. After re-reeling, the natural superiority of the Indian silk in strength and lustre receives a great measure of its due value and the advantage in quality which the Indian silk thus acquires makes up for most of the cost of re-reeling; and we have for this reason treated only a portion of the re-reeling charges as part of the cost of production.

2. Throwing or twisting. The processes.

103. Before the weaver can begin to use raw silk either as warp or as weft, he must subject it to the several processes which in western countries are carried on in a Throwing Mill. The number of these concerns in India is very small. There are three in the Madras Presidency, a few in Bangalore and one in another part of

Mysore. Consequently the majority of the weavers in India either get the various processes performed by hand or buy imported silk which has already been through these processes. The factory processes are:—

(1) Splitting and washing.
(2) Winding and cleaning.
(3) Twisting and steaming.
(4) Doubling and twisting.
(5) Steaming and reeling.

Splitting is only necessary when on account of the coarseness of the raw silk it is necessary to reduce the denier. The object of washing the silk is to remove the gum. When the raw silk is of good and uniform quality the winding and cleaning operations can be done together, by passing the silk, as it is wound from the reeled skeins on to bobbins, between the blades of a double knife which remove all unevenness and hairy filaments. The amount of twisting and doubling required will depend upon the particular purpose for which the silk is needed. Thus 'tram' which is used for weft needs a comparatively small number of twists per inch. 'Organzine' which is used for warp needs to be stronger; it is made up of two or more threads; at the first twisting each thread is twisted separately; the twist is set by a brief steaming; the threads are doubled together; and a second twist is given in the reverse direction to the first. This second twist is also set by steaming as the silk is wound off from the bobbins on to large reels; and the final operation is to sort the silk by weight and wind it into skeins of uniform length. When the work is done by hand, the weaver usually does the boiling off himself, but he gets the twisting done by a specially skilled man. Hand twisted yarn can never compare for strength with the product of a throwing mill.

Organisation and costs of a Throwing Mill.

104. The Throwing Mill may be an independent concern; or it may be run in conjunction with a filature, or a weaving factory. We have seen an example of the independent concern in Kollegal, and examples of each of the other organisations in Bangalore. One factory which we have seen is equipped with 5,000 spindles capable of producing 150 lbs. of organzine or 300 lbs. of tram a day. It employs 150 persons mostly women and children. Women are paid from five to eight annas for a day of ten hours, and children three to five annas for a five and a half hour day. The block value of the plant is Rs. 2 lakhs. It works mainly on a commission basis, charging from Rs. 1-12 to Rs. 2-8 per lb. for warp, and Re. 1 to Rs. 1-4 per lb. for weft. The factory has given us a statement of its costs, from which we are able to infer that it can make a reasonable profit by charging Rs. 2 a lb. for warp and Rs. 1-4 for weft. When the work is done by hand the charges vary in different parts of the country, ranging from Rs. 1-2 to Rs. 1-8 a lb. for twisting and winding and from 2 to 4 annas a lb. for boiling off.

Loss in boiling off.

105. The weaver however is concerned with another matter of importance almost equal to the charge for twisting his silk, and that is the loss of weight which occurs in the boil off. We were informed by some weavers whom we met in Poona that one reason why they prefer imported to Indian silk is that the loss by boil off is less in the case of imported silk; and the Mysore Raw Silk Merchants' Association have made the same statement. The Kashmir Government have pointed out to us that the loss by boil off is always higher in the case of yellow silks, which contain more gum than the white silks. At the same time they maintain that their silk at any rate can stand comparison with Italian silks which lose 23 or 24 per cent. by boil off. The Mysore Government have given us an interesting statement showing the results of degumming tests which they carried out at the beginning of this year in their factory at Mysore.

TABLE XLVI.

Statement showing the results of Degumming Tests carried out in the Government Silk Weaving Factory, Mysore, February and March, 1933.

No.	Name of silk.	Percentage of loss.
	Indian.	
1.	Mysore Filature Silk (Pure Mysore)	20·9
2.	Mysore Filature Silk (Hybrid)	18·4
3.	Mysore Domestic Basin Silk (Private) . . .	20·0
4.	Mysore Country Charkha Silk	23·2
5.	Kashmir Silk (Yellow)	23·7
6.	Bengal Co-operative Union (Yellow) . . .	19·4
	Foreign.	
7.	Canton Steam Filature	21·0
8.	Kubin (Yellow)	22·8
9.	Fanchow (Shanghai White)	18·6
10.	Minchew	18·8
11.	Lai Miyang	20·2
12.	Duppion Silk (White)	11·7

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The representative Indian silks are the Mysore charkha silk, the Kashmir silk and the Bengal silk. The other three varieties represent a very small part of the Indian production. Both the Kashmir silk and the Mysore charkha silk are inferior to all the imported classes by percentages varying from one to five. The Bengal silk compares not unfavourably with the Chinese in this respect. On the whole we should be justified in finding that the balance of advantage in this matter lies with the imported silk.

Competition of imported 'thrown' silk.

106. Another point relevant to our enquiry is to determine how far the Indian raw silk industry is threatened by imports of twisted silk yarn. The most important class of such imports is Japanese organzine the price of which in January, 1933, at Benares was Rs. 20 per seer or about Rs. 10 per lb. It may be assumed that the only Indian silks which can compete with this class of import are filature silks for which we are fixing a fair selling price of Rs. 6-10-9 and the best class of charkha silk which we have priced at Rs. 6-2-6. A loss in boiling off of 22½ per cent. will raise these prices to Rs. 8-2-9 and Rs. 7-9-0 a lb. The charges for twisting and boiling off will increase them further as shown below:—

TABLE XLVII.

Cost of Indian Raw Silk Twisted.

	Filature Silk.						Charkha Silk.					
	Twisted in Mill.			By hand.			Twisted in Mill.			By hand.		
	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.
Price of raw silk	8	2	9	8	2	9	7	9	0	7	9	0
Twisting and Winding	2	0	0	1	6	0	2	0	0	1	6	0
Boiling off	——			0	3	0	——			0	3	0
Total	10	2	9	9	11	9	9	9	0	9	2	0

It is only in the case of filature silk thrown in a mill that the price of the imported article is lower than that of the Indian; and in this case we believe that the higher price of the Indian silk represents a superiority in quality. Moreover we have taken no credit, in considering the throwing mill's costs, of the value of the waste; if we allowed for this there would probably be no excess over the price of Japanese organzine.

State action to encourage re-reeling and twisting.

107. The Mysore Government, as part of their policy of fostering the sericultural industry in the State, have opened re-reeling and twisting classes with the following objects:—

(1) to eliminate the defects, as far as possible, in the raw silk produced in country charkhas in Mysore;

(2) to put on the market Mysore silk which can readily be used by the weaver; and

(3) to provide employment and to create a source of earning to *gosha* women in the villages.

In the last five years they claim to have trained about a thousand women in these classes held in the important silk reeling centres. The classes are run through the agency of one of the prominent silk dealers, who selects the people, provides the raw silk required and finds a sale for the twisted silk. He also engages the teachers.

The course of training lasts about three months; and the Government give a subsidy of about Rs. 1,000 for each school which should cover the pay of the teachers and recoup any loss which the dealer incurs. The Government claim that "the re-reeled and twisted silk produced is reported to find a ready sale in weaving centres provided the rates compare favourably with the imported silks." Unfortunately they have not informed us at what price it is possible for the dealer to place these twisted silks on the market; nor have we been informed either how many of the thousand women who have been trained continue to carry on the work, or what quantity of twisted silk has been produced by this agency and sold. Until the charkha reeling can be materially improved, there is undoubtedly an advantage in re-reeling the silk, and the attempt to train *gosha* women to do the work in villages has our entire support.

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CHAPTER IX.

Silk Waste.

Silk waste first used in China.

108. The Chinese were not only the first craftsmen to find means of utilising the silkworm fibre and to domesticate the most prolific of the silk producing species of worms, but were also the first to make use of the matted and tangled filaments which are found outside and inside of every cocoon, and of the waste which is produced at each stage of the manufacturing process to which the silk worm fibre is submitted before it is fashioned into usable thread.

Silk waste has not previously been used.

109. The waste silk is not produced by tearing up and reducing to ultimate fibre woven silken stuffs that have served their turn or been worn out as is the case in the manufacture of shoddy yarn in the woollen trade. The waste silk fibre from which good spun silk is made, is pure new silk which for some reason or other cannot be successfully reeled and thrown. The silk produced from the waste is known as spun silk and is a very useful and beautiful thread from which many artistic and durable fabrics are made at about half the price of the best quality silks.

Varieties of silk waste.

110. Silk waste is the principal by-product of raw silk. When the silkworm begins to spin the cocoon on a mountage it prepares a hammock by throwing out silk filaments in order to support itself. This silk generally is the outer layer of the cocoon known as floss. The waste consists of this outer layer of the cocoon together with the inner layer which is the silk filament thrown just before the worm has completed its cocoon. Besides this there are other kinds of silk wastes. When the moths used for seed production have cut their way out of the cocoons the empty shells or pierced cocoons are collected and sent to the spinning mills to be made into spun silk. Cocoons cut in filatures for tests are also used as waste as they cannot be reeled. Waste is also produced in throwing and re-reeling operations. Of the various kinds of wastes the reeling waste forms the bulk. Silk wastes in India include (*a*) reeling waste, charkha and filature waste, (*b*) pierced cocoons and (*c*) Throwsters waste. All the silk waste produced in India used to be exported to Europe. The following Table shows the export of silk waste from India:—

TABLE XLVIII.

Year.	Quantity.	Value.
	lbs.	Rs.
1925-26	671,696	7,59,638
1926-27	512,773	7,21,657
1927-28	601,525	7,17,114

Year.	Quantity. lbs.	Value. Rs.
1928-29	690,409	6,63,346
1929-30	722,794	7,36,234
1930-31	395,425	4,28,080
1931-32	292,631	1,53,832

N.B.—The figures furnished above relate to mulberry silks excluding tassar and other wild silks.

Mills for spinning silk waste.

111. Some time ago there were two mills in India, the Sassoon and Alliance Silk Mills and the Chhoi Silk Mills, which were spinning silk yarn out of waste. Silk waste can also be used to a large extent by the cotton mills in India provided a cotton mill has the necessary equipment and facilities for degumming the waste and for ' suppling '. But some of the machinery required for silk waste spinning is different from that used for cotton spinning and it is better, therefore, that the silk waste is treated in the machinery designed for it. Most of the silk wastes produced in India are of inferior grade as they are obtained from charkha reeling. If preliminary operations are properly conducted, Indian waste can be used for manufacturing spun silk yarn. We have no doubt that if the protective scheme is successful there will be filatures established in India and the quality of waste silk will considerably improve, and therefore there will be enough raw material available if the production of silk yarn is undertaken in India.

Estimate of plant for a silk spinning mill.

112. We have had no opportunity of examining the spun silk mills in India because both of the existing mills have closed down. We therefore asked witnesses who appeared before us to give evidence for an estimate of the cost of the machinery required for a waste plant of economic size. The scheme is shown in Appendix B.

Process of spinning silk.

113. We have been supplied by Mr. Shamsuddin Khan, Assistant Superintendent, Sericulture, Mysore Government, who has seen the working of silk waste plants in Japan, with the following particulars of the processes involved in spinning waste silk. With regard to spinning, the waste is first weak boiled in a big copper vessel containing hot water heated by a surrounding steam jacket. The hot water contains Marseilles soap and soda. After it is properly boiled, the material is removed and washed in a cement tank. Again it is washed well in a washing machine until the soapy feel is completely removed. The material is then submitted to the operations of a ' stampedo ' which removes water. Subsequently the material is placed in the hydro-extractor and the latter worked till all water from waste is removed. The material is then removed to a drying chamber whose temperature varies between 85 and 90 degrees. The washed waste is hung and spread out in frames. After the material dries up, conditioning is done by spreading the material and spraying water or 5 per cent.

Marseilles soap solution. After allowing the material to 'supple' for a day or two, it is transferred to the machine rooms where the following operations similar to cotton spinning are carried on with suitable modifications:—

1. Filling.
2. Dressing.
3. Gill spreading.
4. Gill setting.
5. Silver drawing.
6. First roving.
7. Second roving.
8. Ring spinning.
9. Winding.
10. Twisting.
11. Gassing.
12. Reeling.
13. Finishing.

N.B.—The entire plant can be worked by electric power. Steam is required for the degumming cauldron. A large quantity of water is required for washing the waste. A humidifier is also required, as also a gas plant for gassing the thread.

Waste silk of all kinds is collected together, torn to filaments and spun in the same way as cotton, wool or linen fibre by joining the filaments up into threads. A plant with 3,000 spindles is considered an economical unit for India and would cost about Rs. 3 lakhs.

Quantity of waste obtained from Indian cocoons.

114. The percentage of silk waste obtained in reeling depends upon the quality of the cocoons and the reeling appliance employed. In countries like Japan, France, Italy and Central China where univoltine and bivoltine silkworms are reared and where production in filatures is the predominant method, the quantity of waste per pound of silk varies between 0·33 and 0·40 lb. In South China the quantity of waste is about 0·70 lb. per lb. of silk. In Mysore the waste on charkha is 0·50 lb. per pound of silk and in filature 0·70 lb. per pound of silk. In Bengal the silk waste is more than a pound per lb. of silk. The heavy percentage of silk waste in all parts of India excepting Kashmir is due to the fact that the cocoons are multivoltine and possess a comparatively higher percentage of floss. The percentage of waste can be reduced by the utilisation of cross-breeds. Kashmir wastes are of a better quality than those produced in other parts of India. The best of them is known as Sarnakh. The following Table shows the prices of the different kinds of Kashmir waste in foreign markets:—

TABLE XLIX.

Silk Wastes.

	Rate per lb.	
	As.	P.
Sarnakh	14	0
Gudar	10	0
Basin Refuse	4	0
Nim-Gudar	2	6
Winding Waste	6	6
Fluff	8	0

Kashmir silk waste is inferior to foreign waste in cleanliness and method of preparation. It has an elasticity of 16 to 22 per cent. which compares favourably with elasticity of 18 to 40 per cent. found in Italian and French waste. Its tenacity however is only 3 grms. per 13/15 denier against 7 grms per denier in the French and Italian. Even a tenacity of 4 grms. per denier is considered fairly good. The qualities which are required in a good waste are (*a*) freedom from extraneous matter such as dust and bits of wood, chrysalis, etc.; (*b*) absence of hard, knotty pieces which may break the combs of spinning mills or interfere with their smooth working; (*c*) it should not be so opened as to separate fibre from fibre. The loss in degumming in Kashmir waste is shown in the following comparative table:—

TABLE L.

Shanghai	28½
Italy	33
Kashmir	34 to 35

We understand the Kashmir Government are taking steps to improve the quality of their waste. But their efforts in this direction are handicapped by the continued depression in the sericultural industry. We only want to point out the extent of the market and the future prospects of this industry in India.

Market for spun silk.

115. The following Table gives the total imports under the heads 'Silk yarn, noils and warps' during 1927-28 to 1932-33:—

TABLE LI.

1927-28	1,358,170 lbs.
1928-29	2,046.760 ,,
1929-30	1,956.014 ,,
1930-31	1,424.398 ,,
1931-32	1.710.366 ,,
1932-33	3,010.189 ,,

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We have reason to believe that a large proportion of these imports represents spun silk. Thus there is a large market for any amount of yarn which may be produced by mills which may be set up in India. There will be no lack of raw material for their operation since most of it was till recently exported abroad for want of a home market. Only a small portion of it is used for spinning coarse silk such as the *matka* silk in Bengal. On an average 10 lakhs of pounds of silk waste will give about 3 lakhs of pounds of spun silk yarn. India can produce under the present organisation about 10 lakhs pounds of silk waste. We understand from the Sholapur Weaving and Spinning Mills that they require for their purposes silk waste $1\frac{1}{5}''$ long. Indian silk waste however is not available in sufficient quantities in that size. If this want were met more silk waste could be sold in India. We understand further that this could be done if suitable machinery were installed by the cotton mills to cut the waste into the exact lengths required. Such a utilisation of the Indian silk waste by Indian cotton mills will greatly help the raw silk industry which at present is severely handicapped by the low price of the by-product. We have stated elsewhere the reason for the decline of price of silk waste in foreign countries. The following Table shows the decline of prices in India:—

TABLE LII.

Price of Silk Waste per pound.

	As.	P.
March, 1925	12	4
March, 1926	13	9
March, 1927	10	0
March, 1928	7	6
March, 1929	8	0
March, 1930	7	0
March, 1931	3	0
March, 1932	2	8
March, 1933	2	0

Prospects of a silk spinning industry.

116. We are not in a position under our terms of reference to discuss the future of the spun silk industry, but from the facts that have been placed before us there is no doubt that there is no inherent disability in manufacturing spun silk in India since all the requisites of successful production are present. When such manufacture is started whether with or without the help of protection, a growing home market will be found for the silk waste which is at present exported out of India. We have already pointed out the intimate connection which exists between the price of silk waste and the prosperity of the raw silk industry. If the price of this by-product improves it would naturally reduce the cost of production of raw silk. The extent of the Indian market for silk waste may be estimated not only by the quantity of spun silk imported but also by the imports of goods made out of it. We are however unable to give figures as in the trade returns these goods are not distinguished from other silk goods. Most of these goods come from China and Japan and the principal varieties are known to the trade as Fuji and Boseki.

Uses of spun silk.

117. Spun silk yarn is distinguished for its strength, lustre and purity. Its chief use in foreign countries is in the weaving of all kinds of velvets, plushes, handkerchiefs, ribbons or upholstery goods and trimmings; all kinds of hosiery goods are knitted of spun silk either alone or mixed with wool or cotton. It is also used for lacemaking, for embroidery and for machine and hand sewing thread. In India its increasing use in many important weaving centres for goods of all descriptions has satisfied us that there is a market sufficient to justify any steps which private enterprise may take for its production.

CHAPTER X.

The Handloom Weaving Industry.

Handloom industry the main consumer of Indian raw silk.

118. The handloom weaver is the main consumer of the raw silk produced by the sericultural industry in India. We have heard of three small mills—one in Calcutta, one in Bombay and one in Mysore—in which silk fabrics are manufactured on power-driven looms; but the quantity of raw silk consumed in these mills constitutes an insignificant proportion of the Indian production. Kashmir has almost lost the European market which till quite recently used to absorb a great proportion of the filature silk both from Srinagar and from Jammu. And to-day for all practical purposes it would be correct to regard the handloom weaver in India as the consumer of the bulk of the raw silk produced in the country. It is therefore important to study the condition of the silk weaving industry; to see how far it is capable of absorbing the quantity of silk produced in India or any greater quantity which might be produced; and to see how far the quality of the silk produced in India satisfies the weavers' requirements. For it will be of little avail to protect the sericultural industry in India, unless the silk which it produces is of the sort which the Indian weaver wants, and unless the weaver is prepared to use as much silk as the sericultural industry is likely to produce.

Distribution of the weaving industry.

119. The silk weaver is found in all parts of India. In our study of this industry we have suffered under the same disadvantage as that mentioned in connection with the sericultural industry, the lack of reliable statistics of production. We have accordingly had to rely upon such information as Local Governments and States have been good enough to supply. Unfortunately our information is far from complete; for we have received no report from Burma, where the silk industry is of considerable importance; and the only States from which we have received information are Kashmir, Mysore and Hyderabad, of which the first two have a special interest in the sericultural industry. The particulars supplied to us as summarised in the following Table, though admittedly incomplete, are sufficient to indicate how widely distributed and of what immense value to the country is the silk weaving industry.

TABLE LIII.

Statement showing the Distribution and Value of the Silk Weaving Industry in India.

Province or State.	No. of persons supported.	No. of looms working on			Annual value of production of silk goods.
		Silk.	Cotton.	Total.	
					Rs.
Punjab	..	3,000	186,837	192,337	25,90,000
United Provinces . . .	..	10,000	75,000	87,500	1,25,00,000
Bihar and Orissa . . .	..	3,900	239,728	243,628	..
Bengal	..	2,156	..	..	15,00,000† 3,42,000
Assam	2½ lakhs.	..	..	..	20,00,000
Central Provinces . . .	..	3,000	78,000	97,500	37,05,850
Bombay	..	10,000	32,450	87,500	2,29,30,000
Madras	520,737	..	..	193,474*	1,70,00,000
Mysore	..	8,000	16,000	34,000	48,00,000
Kashmir	..	2,000	42,000	44,125	10,50,000
Hyderabad	406,881	4,183	93,422	97,605	34,57,200
TOTAL .	..	46,239	763,437	1,077,669	7,18,75,050

Not only is information lacking for the province of Burma and for most of the Indian States, but Bihar and Orissa has given no estimate of the value of the silk goods produced on her 3,900 looms; Assam has given no estimate of the number of looms in the province; nor has Madras attempted to compute the number of looms employed in silk weaving as opposed to those employed in weaving cotton goods or mixtures. The difference between the total number of looms reported and those shown under silk and cotton represents the number reported as being used in the weaving both of cotton and silk. In paragraph 32 we have put the value of the annual production of raw silk and waste at less than a crore and three quarters; the statement above shows the value of the silk goods produced in the provinces and States which have reported to us, as over seven crores, Bombay, Madras and the United Provinces being the chief contributors.

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* Census of 1931 "an underestimate".
† Matka spun silk.

Production of silk goods declining.

120. We have been informed that in the principal weaving centres in the Bombay Presidency, the consumption of silk, Indian and imported, and artificial silk by handloom weavers declined between 1928-29 and 1932-33 from 673,750 lbs. to 635,780 lbs. or by about 6 per cent. This is confirmed by a comparison of the total quantity of silk and artificial silk imported and produced in India in the years 1928-29 and 1931-32.

TABLE LIV.

Quantity of Raw Silk imported and produced in India (in lakhs of pounds).

	1928-29.	1931-32.	Percentage of variation.
Imported Raw silk . .	24·16	19·23	–20
,, Silk yarn . .	20·46	17·10	–16
,, Artificial silk yarn	76·68	79·63	+ 4
Produced in India—Raw silk	23·00	20·65	–10
TOTAL .	144·30	136·61	– 5

It is true of course that there has been a great increase of imports in 1932-33. But this, as we show in another Chapter, must be attributed to special causes, partly to the abolition of export duty and grant of a bounty on exports from China, partly to the depreciation of the exchange values of Chinese and Japanese currency and partly also to the natural desire of importers to increase their stocks in case the duty should be raised as a result of our enquiry. We have received no evidence that the large imports in 1932-33 which have been accompanied by a further fall in Indian production have resulted in any increase of activity in the handloom weaving industry. If on the one hand the fall in the price of silk has induced a certain number of people to use silk goods instead of cotton, the decline on the other hand of purchasing power must have reduced the demand for silk goods which being mainly luxury articles will be among the first to feel the effects of the economic depression. That there has in fact been a reduction in the demand for silk articles manufactured on handlooms in India is indicated also by the very marked fall in the weavers' wages to which we refer in a later paragraph.

Organisation of the weaving industry.

121. In most parts of the country the organisation of the industry is in the hands of the merchants who finance it. The merchant supplies the weaver with yarn, and takes over the finished articles from him, paying him either a daily wage or more often at a rate fixed per piece of cloth. The weaver works in his own house, the loom and the tools necessary for the work belong to him. But to this general rule there are many local exceptions. In Kashmir, for example, much of the handloom weaving is done in factories in which ten or more looms belonging to the owner of

the factory are worked by paid labour. The factory owner as a rule is independent of local merchants, buys his own yarn and markets himself the cloth which he manufactures. In the Punjab the common system of organisation is for a capitalist shopkeeper to employ weavers on piecework wages; but some weavers in rural parts who manufacture cloth for local consumption, if they have any left on their hands, either sell it to local shopkeers or hawk it round to weekly markets or in neighbouring villages. In Benares we are told that both merchants and weavers (persumably master weavers are meant) have found it to their interest to become less dependent on each other. The weavers, unless making goods of special quality or design, buy their own materials and sell the finished article in the open market. In Bengal it is only the more prosperous weavers who can afford to get their yarn direct from reelers. The poorer weavers are in the hands of merchants who are alleged to make a double profit, first by buying yarn at 84 tolas to the seer and advancing it to the weaver at 81 tolas to the seer, and secondly by charging commission at the rate of 6¼ per cent. on the sale of cloth. In Assam we are told that the whole of the silk business from cocoons to cloth is in the hands of Marwaris; five years ago the value of their transanctions was Rs. 28 lakhs; now, though there has been no decline in production, the value has fallen to Rs. 15 lakhs. In the Central Provinces it is only 20 per cent. of the weavers who sell their finished goods to the merchant from whom they bought the yarn; generally yarn is bought either for cash or on credit, and the cloth is sold for cash. In Bombay the practice is far from uniform. In Surat and Ahmedabad which are two of the biggest weaving centres the weavers are paid daily wages. In some centres contract rates are fixed for periods of three months. There is also what is known as a conditional system under which a weaver must give the merchant who supplied him with yarn the first refusal of his finished article, but is not bound to accept any price the merchant offers. In Mysore, though the weaver generally follows the common practice of selling his cloth to the merchant, he may in the marriage season when business is lively deal directly with his customers. From these accounts of the various systems in force throughout the country it may be concluded that the industry may generally be described as in a state midway between what was known in England in the eighteenth century as the "domestic system" and that of a factory industry.

Raw materials.

122. The raw materials used by the silk weaving industry in India are raw silk, twisted silk and gold thread, all of which may be either Indian or imported, and spun silk and artificial silk yarn which are all imported. In Assam the raw silks obtained from the *muga* and *eri* worms are largely used; *tasar* is used in large quantities in Bihar and Orissa and the Central Provinces. Of the Indian mulberry silks, Kashmir silk is largely used in the Punjab and the United Provinces and to some extent in Bombay and the Central Provinces. Bengal silk is mostly used in Bengal itself but also finds a market in Bombay and Madras, and Mysore silk is largely

used in Bombay and Madras as well as in the Mysore State. Most of the imported raw silk comes from China and Japan, though some silk in insignificant quantities is imported by overland routes from Yarkand into the Punjab. Imported twisted silk is largely used in Benares in the form of Japanese organzine. Spun silk—manufactured from silk waste—is used in all the principal weaving centres; most of it comes from China, Japan and Italy, and a comparatively small quantity is imported from other European countries. Artificial silk yarn from Italy, Japan, the United Kingdom, Holland, France and Germany is used in increasing quantities in all provinces except Bengal. Of the gold thread consumed, some is of Indian manufacture and some is imported from France.

Price the chief criterion for raw materials.

123. Price is the main factor in determining the weaver's choice of raw materials as it is with his customer who buys his finished goods. As between Indian and imported raw silks, we are informed from the United Provinces that foreign silk offers greater profits to the merchants, though we understand that occasionally the merchant prefers to use Indian silk because he gets the advantage of its superior lustre leaving the disadvantage of its inferior winding quality to be borne by the weaver. Weavers always prefer the foreign article partly on account of its low price and partly because they can buy it either twisted or re-reeled. In the Central Provinces weavers and merchants agree that "Kashmir silk is decidedly superior to every other kind hitherto used". "To open out a seer of Chinese silk takes as much as six days, while a seer of Kashmir silk could be opened in a day. This factor raises the cost of Chinese silk by nearly Re. 1 a seer." But as Kashmir silk is Rs. 6-8 a seer more expensive than Chinese silk, there is an advantage of Rs. 5-8 a seer in using the imported article. This advanage is illustrated by two examples of the cost of manufacturing saris from Chinese and from Kashmir silk:—

TABLE LV.

(1) *Cost of manufacturing a sari 9 yards × 45″ with 40s warp and weft containing 8 oz. of silk in the border.*

	Using Chinese Silk.		Using Kashmir Silk.	
	Rs.	A.	Rs.	A.
Cost of cotton yarn 1¼ lb. at Rs. 8 per 10 lbs.	1	0	1	0
Cost of ½ lb. silk	2	3	3	13
Opening silk	0	8	—	
Cotton dyeing	0	5	0	5
Silk dyeing	0	14	0	14
TOTAL	4	14	6	0

The weaving of this sari gives a weaver two days' work. The sari sells for Rs. 7.

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(2) *Cost of manufacturing a sari 9 yards × 45″ woven with 40s warp and 20s weft containing ¼lb. silk in the border.*

	Using Chinese silk. Rs. A. P.	Using Kashmir silk. Rs. A. P.
Cost of cotton:—		
½ lb. 40s.	0 8 0	0 8 0
1 lb. 20s.	0 10 0	0 10 0
2 hanks 60s.	0 0 9	0 0 9
10 tolas silk	1 1 6	3 0 0
Other expenses	0 8 0	0 8 0
Opening silk	0 4 0	—
Warping, etc.	0 3 0	0 3 0
TOTAL	3 3 3	4 13 9

This sari sells for Rs. 5 to Rs. 5-8-0.

It will be clear from these examples why the weaver finds it to his interest to use the cheaper Chinese silk in spite of the risk, mentioned by the Director of Industries, Central Provinces, that the use of the cheaper and poorer article may reduce the popularity of this class of silk bordered fabric.

Competition between Indian and imported raw silk.

124. Neither Indian silks nor foreign silks are of one variety and quality; and little can be learnt from a comparison unless we have an exact description of the articles which are being compared. But there is a general agreement that on the whole Indian silks have a better lustre than imported silks, that in tenacity and elasticity the Indian silks can at least hold their own, and that it is only in winding qualities due to more efficient reeling that the foreign silk has an advantage. There is a general complaint that the loss in degumming is greater in the case of Indian silk than in the case of Chinese silk. This again is to some extent due to defective methods of reeling. The Industrial and Trade Association, Benares, has expressed the opinion that Kashmir silk, though stronger, is less lustrous than Japanese. But this is opposed to the views of the majority. On a review of the whole of the evidence we believe that the Indian weaver, though he may have a natural preference for an Indian article and though this natural preference may have been fostered by the spread of a swadeshi spirit, is actually using the imported article in increasing quantities. The main reason is the lower price of the imported silk. But this reason is reinforced by the fact that imported silk gives him less trouble. He may use spun silk or imported organzine, in which case he has no trouble with boiling off or twisting. Or he can buy re-reeled foreign silk, and save himself the trouble of either getting Indian silk re-reeled or of using it on his loom in

the imperfect and irregular condition in which it is placed on the market.

Defects in the marketing of Indian raw silk.

125. It has been forcibly impressed upon us that one reason why the weaver prefers to use imported silk is the lack of enterprise and method in the marketing of Indian raw silk. The silk producing centres have made no effort to advertise the merits and varieties of Indian silks, and a most serious handicap to the Indian silk is the difference in the units of weight between one silk producing centre and another and between the silk producing and the weaving centres. Bengal quotes silk per seer of 80 tolas; Mysore quotes it per seer of 26½ tolas; and Madras per seer of 72 tolas. The number of tolas in the seer by which the silk is sold varies between centres in the same province, such as Poona, Hubli and Gadag. The unfortunate weaver is never certain exactly what he is buying. To obviate these disadvantages it has accordingly been suggested that the silk producing centres of India might well open depots in the various weaving centres, where their several varieties and qualities should be stocked for sale to weavers. It has also been suggested that the following measures should be made compulsory for producers of Indian silk:—

(1) that they should only sell their raw silk after it has been re-reeled and twisted to suit the weaver's needs;

(2) that each hank of silk after twisting should be made up in a definite form and weight and should bear a label stating its weight and description of the silk;

(3) that a minimum size should be prescribed for a parcel or book of hanks.

We are recommending that the improvement of the methods of marketing should be one of the subjects to receive early attention, and we commend these suggestions for consideration to the Imperial Council of Agricultural Research.

Competition of artificial silk yarn.

126. We have tried to ascertain the extent to which the increasing imports of artificial silk yarn threaten the Indian sericultural industry. In the Punjab, the Central Provinces, Bombay and Madras it is definitely asserted that artificial silk yarn has to a considerable extent replaced raw silk. The Director of Industries, Bombay, has given us the following interesting comparison of the quantities of Indian silk, imported silk and artificial silk yarn used in the principal weaving centres of Bombay in 1928-29, 1930-31 and 1932-33.

TABLE LVII.

	Indian raw silk consumed. lbs.	Per cent.	Imported raw silk. lbs.	Per cent.	Artificial silk yarn. lbs.	Per cent.
1928-29 . .	210,000	31	453,000	67	10,750	2
1930-31 . .	218,500	27	361,000	45	218,950	28
1932-33 . .	109,000	17	263,600	42	263,180	41

Artificial silk yarn which is itself cheap and which is being encouraged by a lower rate of duty has evidently replaced both imported raw silk and Indian raw silk to a marked degree. In the United Provinces it is held that artificial silk competes with cotton rather than with natural silk; and in Bengal we are informed that hardly any artificial silk is used. The evidence from Mysore is to the effect that artificial silk has been discredited as a substitute for natural silk by the fact that it will not stand washing and by its poor durability. We agree that artificial silk yarn is not strictly comparable with natural silk. But its extreme cheapness has undoubtedly led to its substitution for natural silk on a large scale. The minimum price quoted for artificial silk yarn in the principal weaving centres is Re. 1, representing a c.i.f. price of 13½ annas. The minimum price quoted for Indian raw silk in weaving centres is Rs. 4 while imported raw silks are sold at prices which touch Rs. 2-12-0 (Rs. 2-3-0 c.i.f.). Thus the difference in price between the cheapest imported raw silk and artificial silk yarn is about Rs. 1-6-0 a pound. We have attempted in the following statement to exhibit the saving in cost to a weaver by the use of artificial silk:—

TABLE LVIII.

Cost of manufacture of a sari, 9 yards × 45″.

Weight.	Indian silk. 1¾ lbs.			Spun silk. 1⅜ lbs.			Artificial silk. 2 lbs.		
	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.
Cost of raw material (including cost of labour, etc.) .	14	1	0	6	0	3	2	4	0
Cost of manufacture . .	4	14	0	4	14	0	4	14	0
TOTAL .	18	15	0	10	14	3	7	2	0

We consider that the price advantage in favour of artificial silk is so great that an increase in the duty on raw silk, unless it is accompanied by an increase in the duty on artificial silk yarn, will certainly be a direct incentive to weavers to extend rapidly the substitution of artificial silk for natural silk.

Competition of spun silk.

127. Another serious competitor against Indian raw silk is the spun silk which is imported in such large quantities from Italy, Japan and China. There are three main varieties among these imports, noil yarn of denier 40/2 which is now selling in Bombay at Rs. 1-4-0 a pound, cordonate silk of denier 60/2 whose present price is Rs. 3-5-0 a pound, and spun silk of deniers 140/2, 210/2 and 160/2 which is selling at Rs. 3-6-0 a pound. We understand that 60 per cent. of the imports are spun silk of denior 140/2. This silk is comparable with the better qualities of Chinese hand reeled silks which sell at about the same price. The advantage to the weaver in using spun silk is that it does not need re-reeling or twisting, so that he saves the expense of these operations as well as the loss in degumming. We hold that unless any increase of the

duty on raw silk is accompanied by a corresponding increase in the duty on spun silk, the weaver's preference for spun silk will be greatly strengthened.

Varieties of cloth manufactured.

128. We have been supplied with information from most of the provinces regarding the varieties of cloth usually manufactured by the local silk weavers. Saris, lungis, suitings and shirtings are produced in all parts of the country; and apart from these articles of universal use each province produces its own special types of cloth used by men and women for their apparel. We have tabulated the information in Appendix C. All provinces complain of severe competition of imported goods with their suitings and shirtings. Other classes of goods in which competition is felt are lungis, handkerchiefs, turban cloths and ladies' suits and scarves. In so far as the silk goods manufactured in India are of special design either in the piece or in the border, the handloom silk weaver has as yet not been embarrassed by the competition of foreign imports. Fashions, however, even in a conservative country like India are not constant and we believe that except in the south of India there is a growing demand for silk saris of foreign manufacture. To some extent this tendency is checked at present by the swadeshi movement. The following statement which shows the quantity and value of imported goods made of pure silk, of silk mixed with other materials, and of artificial silk is a sufficient indication of the increasing degree of competition both in volume and in price which the Indian weaver has had to meet:—

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TABLE LIX.

Imports of Silk and Artificial Silk manufactured Goods.

	Goods of silk mixed with other materials.			Silk Piecegoods.			Artificial silk goods (including mixtures of cotton and artificial silk).		
	Quantity Thousands of yds.	Value Rupees lakhs.	Average value Rs. per yd.	Quantity Thousands of yds.	Value Rupees lakhs.	Average value Rs. per yd.	Quantity Thousands of yds.	Value Rupees lakhs.	Average value Rs. per yd.
1926-27 . . .	2,136·2	30·9	1·4	18,912·1	243·0	1·3	41,978·3	308·7	0·7
1927-28 . . .	2,449·2	35·2	1·4	21,291·4	258·1	1·2	53,140·8	386·4	0·7
1928-29 . . .	2,864·8	40·2	1·4	21,872·8	244·3	1·1	49,801·0	330·4	0·7
1929-30 . . .	2,989·9	34·7	1·2	22,924·6	222·6	0·9	56,600·0	315·0	0·6
1930-31 . . .	4,600·2	28·1	0·6	16,754·8	126·9	0·7	51,495·5	211·6	0·4
1931-32 . . .	5,089·6	30·2	0·6	19,924·2	126·2	0·6	84,639·3	251·8	0·3
1932-33 . . .	10,103·3	43·5	0·4	34,957·9	180·9	0·5	125,257·0	310·2	0·2

Moreover, we anticipate an increase in the mill production of silk goods in India; in which case the production of such standard goods as suitings, shirtings and coatings on handlooms will no longer be economical. Yet it seems probable that the demand for goods of special design will continue to be sufficient to employ a large number of handloom weavers.

Processes of the handloom weaver.

129. The operations preliminary to weaving consist of twisting and winding, boiling off, dyeing, and doubling and warp preparation. Those who buy Japanese organzine or silk twisted in a throwing factory are saved the trouble of twisting and boiling off. Twisting as a rule is done by a special class of men for a fixed charge of 8 to 12 annas a pound. Boiling off and dyeing are usually done by the weaver himself and doubling and warp preparation are also as a rule done by the weaver and his family. Where, as in the Punjab and Kashmir, much of the handloom weaving is done in small factories, each operation is performed by a special man who does nothing else. In the Central Provinces there are professional dyers who undertake the work of boiling off and dyeing. The statement in Appendix C gives the charges made for these various operations as also the weaving charges for each of the kinds of cloth for which we have received the information. The weaver is usually paid by the piece; but where we have ascertained his normal daily production we have been able to calculate the amount which he earns in a day. It will be observed that in the majority of cases the raw material represents fifty per cent. or more of the cost of manufacture. The weaver's daily wage falls as low as four annas in Bombay and four and a half annas in the Punjab and reaches a maximum of Rs. 1-4 in Bombay or Rs. 2-6 in Madras. These high wages are given for exceptionally skilful work. In the Punjab even higher wages are reported in certain cases in which the daily production is said to reach the surprisingly high figure of 15 to 50 yards.

Fall in prices and wages.

130. The Director of Industries, Bombay, has supplied information regarding the reduction in costs, in selling price and in the weaver's wages between 1928-29 and 1932-33. We reproduce extracts from this information in the table below:—

TABLE LX.

Prices of typical pieces of cloth.

Weaving Centres.	Cost price.		Sale price.		Weaver's wages per day.	
	1928-29.	1932-33.	1928-29.	1932-33.	1928-29.	1932-33.
	Rs.	Rs.	Rs.	Rs.	Rs. A. P.	Rs. A. P.
Ahmedabad .	155	132	180	140	1 5 4	1 0 0
Surat . .	150	130	175	150	1 12 9	1 3 2

Weaving Centres.	Cost price.		Sale price.		Weaver's wages per day.	
	1928-29.	1932-33.	1928-29.	1932-33.	1928-29.	1932-33.
	Rs.	Rs.	Rs.	Rs.	Rs. A. P.	Rs. A. P.
Poona . .	115	94	125	95	1 0 0	0 8 6
Surat . .	110	77	125	80	2 0 0	1 0 0
Poona . .	90	78	100	80	1 0 0	0 9 7
Yeola . .	83	49½	90/95	55	1 7 6	0 8 6
Ahmedabad .	60	30	70	32	1 0 0	1 0 0
Surat . .	60	30	65	32	1 0 0	1 0 0
Ahmedabad .	45	31	50	35	1 10 0	1 0 0
Surat . .	44	22½	50	25	1 0 0	1 0 0
Ahmedabad .	41	21	46	24	1 0 0	1 0 0
Surat . .	40	30	50	32	2 0 0	1 0 0
Ahmedabad .	37	21	40	25	2 0 0	1 0 0
Surat . .	35	19	40	20	2 0 0	1 0 0
Poona . .	34	23½	36	25	0 10 0	0 5 0
Poona . .	34	23½	36	25	0 10 0	0 5 0
Ahmedabad .	31	16	35	20	1 8 0	1 4 0
Yeola . .	27	13	30	15	0 10 0	0 8 6
Yeola . .	27	13	29	15	0 10 0	0 5 4
Yeola . .	27	13	29	15	0 10 0	0 5 4
Surat . .	26	14	30	15	1 8 0	1 0 0
Poona . .	22	16½	24	17½	0 6 6	0 6 0
Surat . .	20	14	25	15	1 0 0	1 0 0
Poona . .	16½	14¾	17½	15½	0 10 0	1 0 0
Bombay . .	15	6	17	7	1 0 0	0 12 0
Yeola . .	13½	7¾	15½	8	0 6 6	0 5 0
Poona . .	13	10	14	11	0 8 0	0 4 0
Yeola . .	10¼	$5\frac{11}{16}$	11½	7	0 4 6	0 4 0
Ahmedabad .	7	4	8	4½	1 0 0	1 0 0
Surat . .	7	4	8	4½	1 0 0	1 0 0
Bombay . .	5·15	3⅞	7	4½	0 8 0	0 8 0

It will be seen that the price of medium and cheap cloth has fallen much more than that of the more expensive cloths. Wages which in 1928-29 went up to Rs. 2 a day in Ahmedabad and Surat, now exceed Re. 1 a day only in Surat and then only for men working on the most expensive brocades. Wages have fallen more heavily in Poona and Yeola than in other centres, and less in Ahmedabad and Surat where the minimum wage is still as high as Re. 1 a day.

Effect of our proposals on the handloom industry.

131. Our survey of the handloom industry suggests the following considerations. Any development of sericulture in India must depend upon the existence of a large and growing market. This market is now provided almost entirely by the handloom industry. This industry has not escaped the effects of the depression of recent years. There has been a slight decline in the production of silk goods and a very considerable substitution of cheaper materials such as artificial silk yarn for the more expensive material such as raw silk. There has been a great fall in prices and in the margin of profit, and in most centres a serious fall in the weavers' wages representing in a great measure the fall in the cost of living. Any measure of protection to the sericultural industry which results in increasing the cost of the weaving industry's raw material must increase the weavers' difficulties. We should hesitate to recommend any measure which might be injurious to an industry so widely spread. Indeed practically every local Government has protested against any raising of the duty on raw silk unless it is accompanied by an increase in the duty on imported silk manufactures sufficient to compensate the weaving industry for the increase in the cost of its raw materials. We agree with this view and are recommending that the duty on imported silk fabrics and mixtures be increased by an amount which will compensate for the increased duties which we are proposing on raw silk.

CHAPTER XI.

Marketing of Indian Silk.

General features of the Indian silk marketing organisation.

132. Indian silk being produced mostly on a cottage basis, its marketing is done more or less on the same lines as the marketing of the products of other Indian cottage industries. It is sold through a local merchant or a commission agent in the neighbouring town, who also acts as the financier of the producer. It reaches the ultimate consumer—the weaver or the owner of a weaving establishment—after passing through one or two more middlemen. The sales organisation of a big power-driven concern is necessarily different, while the Kashmir monopoly being *sui generis* has its own special methods of disposing of its output. The marketing of imported silk follows the usual lines of the sale of foreign goods, *i.e.*, it is bought by commission agents from importers and distributed through one or more middlemen in all parts of the country. There being no silk mill weaving on a large scale in India, very little or no silk is imported direct by the consumers. There are variations from these broad features in different places. These we shall describe in subsequent paragraphs in their appropriate places.

Nature of the Indian demand for raw silk.

133. Silk is mostly demanded in India for manufacturing dress materials such as saris, headwear, shirtings and suitings, for making embroidery work and for manufacturing borders and 'palavs' of certain classes of cotton saris used in the Central Provinces, Bombay and South India. Some small amounts are used for manufacturing detachable sari borders and the core of gold thread. There is a war use of silk which we have already described in Chapter II and a demand for silk for electrical insulators and surgical dressings, but these articles are not manufactured in India. For sewing thread generally the coarsest kinds of charkha reeled Chinese silk called Panjam and Mathow are consumed. Other coarse Chinese varieties of a slightly better quality of which Li Minyang is the cheapest and the most popular are used for making lengthwise borders and 'palavs' or transverse borders of cotton saris, while the superior varieties of both Indian and Chinese silk are used for the main body of a silk cloth piece. For high grade articles, generally filature and re-reeled silk both Indian and foreign and the best charkha silks are used, filature silk being generally preferred for warp and the lustrous charkha Indian silks for weft.

Size of the Indian market.

134. The total Indian demand for raw silk cannot be exactly measured, as we have no reliable figures of Indian production, but using the rough figures adopted in Chapter II, we arrive at the following result for the last six years by adding total production *minus* export to total imports less re-exports:—

TABLE LXI.

Consumption of mulberry reeled silk in India.

—	Indian Production lakhs of lbs.	Exports		Net consumption of Indian production lakhs of lbs.	Foreign Imports			Re-exports			Net consumption of foreign imports lakhs of lbs.	Total consumption lakhs of lbs.	Percentage of consumption met from Indian production.
		By land lakhs of lbs.	By sea lakhs of lbs.		By land lakhs of lbs.	By sea lakhs of lbs.	Total lakhs of lbs.	By land lakhs of lbs.	By sea lakhs of lbs.	Total lakhs of lbs.			
1926-27 . .	27·43	..	1·21	26·22	3·92	17·83	21·75	..	·45	·45	21·30	47·52	55·17
1927-28 . .	26·63	..	1·64	24·99	3·47	23·56	27·03	..	·15	·15	26·88	51·87	48·17
1928-29 . .	24·43	..	1·43	23·00	2·92	21·31	24·23	·01	·06	·07	24·16	47·16	48·77
1929-30 . .	23·53	..	1·57	21·96	3·85	21·75	25·60	..	·09	·09	25·51	47·47	46·26
1930-31 . .	22·21	..	·26	21·95	3·42	19·39	22·81	..	·13	·13	22·68	44·63	49·18
1931-32 . .	20·70	..	·05	20·65	3·94	15·63	19·57	..	·34	·34	19·23	39·88	51·78

On the assumption that what is produced in one year is consumed in the next it appears that the consumption of raw silk reached its peak in 1928-29 with a total of 51·27 lakhs of pounds. The effect of the depression on consumption is well marked in 1930-31 and subsequent years. It appears that on the average 45 to 50 per cent. of the entire consumption is met from Indian production. It would further appear on the assumption of the correctness of these figures that the Indian share of the total amount recorded has increased in the last two years but it is probable that the Indian figures of production in those years as supplied to us by witnesses are somewhat over-estimated. This inference does not seem to be far fetched if we take into account the large abnormal imports of 31·86 lakhs of lbs. for the year 1932-33. On the whole we shall be justified in assuming that during normal times about half the Indian demand is met from production within the country.

Absence of sorting and grading of Indian silk.

135. The most serious defect of Indian silk from the marketing point of view is that, except in the steam filatures of Kashmir and Mysore, not the slightest attempt at sorting or grading is made. The Indian reeler, particularly the Mysore charkha reeler, we have been assured, does not sort his cocoons but mixes bad with good and produces a uniformly indifferent article which in the nature of things cannot be sorted. All differences in quality in Mysore silk are explained as being due to differences in the care taken in reeling. We have been further told that even in a filature, where more exacting standards may be expected, sorting of cocoons is rendered impossible by the excessive amount of floss on the Mysore cocoon which makes them stick so close together as to render their separation for sorting extremely costly. Probably this defect in the Mysore cocoon is not racial but the direct result of crowding of the worms when they start spinning. Whatever be the reason for this in Mysore we find sorting of cocoons practised to some extent in Bengal probably due to the influence of old European filatures. In Kashmir and Jammu different qualities of silk are produced from different grades of cocoons and different reeling plants classified into four and three classes as follow:—

Kashmir.

Lotus—1st grade cocoons and machines.
Iris—2nd grade cocoons and 1st class machines.
Tulip—1st grade cocoons and 2nd class machines.
Saffron—2nd grade cocoons and 2nd class machines.

Jammu.

Neel—1st grade cocoons on modern basins.
No. 1—1st grade cocoons on local basins.
No. 2—2nd grade cocoons on local basins.

This classification however is not scientific inasmuch as it does not result from the application of the unvarying mathematical tests of denier, uniformity, elasticity and tensile strength etc., conducted by conditioning houses in Japan, Europe and America by which a particular brand of silk is known and quoted on an organised market. The Kashmir Government, producing as it does for an export market, tries to maintain fairly uniform standards from year to year by greater care and supervision in production, but this falls short of scientific grading. Therefore even Kashmir silk lacks the quality of cognisibility which is an essential requisite of economical dealings in the world's great markets. This grave defect in Indian silk makes a large export trade almost impossible. Even within India it makes the operation of marketing a trial of wits between the merchant and the producer and the dealer and the consumer, in which generally the battle goes to the nimble witted and the victory to the strong.

Rough classification. Absence of a conditioning house.

136. After the reeler has parted with his goods some sort of a rough classification of their purchases is made by the merchants in Bengal and Mysore. They divide them into two or four kinds and a difference of four to eight annas per pound is charged for the difference of quality between two neighbouring classes. But the difference is so uncertain and arbitrary that buyers in despair turn to the foreign commodity where the grading is based on more objective standards. It is a commonplace of marketing economics that the margin of profit made by dealers on articles of well known brands and unvarying quality is generally much smaller than on less well known articles whose quality is not constant. There is not a single conditioning house in India like those in Lyons, Milan, Yokohama and New York, where a certificate of quality may be obtained for the purpose of facilitating transactions on the market. Labouring under this handicap Indian silk of good quality does not get the price which it ought to fetch and since good silk under this system is apt to be lumped with the bad, all incentive to quality production is lost. In some advanced countries like Japan no dealings can take place in any silk unless it has first received the certificate of a central conditioning house.

The chief Indian markets.

137. Practically every centre where silk weaving is carried on in India is a market for Indian silk. Such centres are generally more important where weaving silk saris, dhoties and turbans is the vogue and the use of silk is regarded as essential for religious and social ceremonies. The areas which conform to this description are generally situated south and east of a line drawn from Ahmedabad to Benares, *i.e.*, the whole of South India and the Deccan, Central Provinces and Bengal. Bombay and Punjab are important consuming centres but they use more foreign silk and manufacture more of other goods than saris and dhoties. The

chief consuming centres are Amritsar, Jullundar, Multan in the Punjab, Benares and Shahjehanpur in the United Provinces, Murshidabad, Malda, Bankura, Vishnupur in Bengal, Nagpur in the Central Provinces, Bhagalpur in Bihar and Orissa (*tasar* silk), some scattered places in Assam and Burma, Surat, Ahmedabad, Poona, Yeola, Belgaum, Dharwar, Hubli, Sholapur, Bagalkote in Bombay, Bangalore and Mysore in Mysore, Dharmavaram, Berhampur, Kumbakonam, Conjeevaram, Trichinopoly, Salem and Tanjore in Madras. The great distributing centres for these consuming areas are Delhi, Benares and Amritsar in the north, Maldah, Murshidabad and Calcutta in the east, Surat, Bombay and Poona in the west and Bangalore, Kumbakonam, Conjeevaram in the south. There is a regional as well as quality division of these markets between the three varieties of Indian silk. Mysore silk generally sells in South India and the southern part of the Bombay Presidency and is rarely found in the east and north of India, Bengal silk generally monopolises its home market, but is found in markets as far apart as Conjeevaram in the south, Poona and Surat in the west and Amritsar and Benares in the north. Some of these markets are being gradually lost as a result of the competition of foreign silk. Benares and Surat its former chief markets, and Nagpur have been captured partly by Kashmir and partly by foreign silk. But even now 25 per cent. of the entire business of an important Malda firm is done with Conjeevaram. Kashmir silk is generally used in the north and wherever swadeshi high grade silk is in demand. It is therefore found in small quantities in all parts of India except Bengal and the extreme south of India. It is certainly used in Surat, Nagpur, Benares and Bombay. Kashmir silk being reeled on filatures is suitable for warp while the soft and lustrous Bengal and Mysore silks are generally in demand as weft. In spite of this territorial division there are a limited number of points *e.g.*, Conjeevaram in the far south where all silks, including foreign silk, meet in competition.

Export markets.

138. We have already said that Mysore had at no time a foreign outlet for its reeled silk. Bengal had a very large foreign market which she lost some time back as described in Chapter II and Kashmir had one until last year when all exports ceased. Kashmir silk used to be sent to France, England and Italy, where it was regarded as a very good silk, only inferior to the classical Italian silks. All the three areas moreover used to export large quantities of silk waste until 2 years back, but owing to the competition of Chinese silk waste and artificial silk yarn even these exports have ceased. Silk waste used to be bought by European export houses in Calcutta, Madras, Bombay and through their local agents and used to be exported to France and England. At present there are practically no sales and we found large stocks accumulated in the reelers' houses. Besides silk waste, there were before the depression small exports of *tasar* cocoons and *tasar* silk waste from the producing provinces of Bihar and Orissa and Central Provinces through the port of Calcutta.

Marketing organisation in the different areas : Mysore and Kollegal.

139. The reeler in Mysore sells his silk through a merchant in Bangalore or some other distributing centre who charges a commission of 1½ annas per pound for every pound sold through him. Until the silk is sold, the reeler used to get before the depression an advance from the merchant from 50 to 75 per cent. of the value of his silk free of interest, but now he has to pay 10 to 12 per cent. interest for it. In a dull market, the reeler has to wait for cash until a purchaser has been found when the whole account is adjusted. Buyers from the consuming centres either merchants or large scale weavers buy the silk they require either directly from the merchants on payment of a commission of one and half anna per pound or through recognised brokers of whom there are about five in Bangalore. If the broker's services are engaged an inclusive commission called 'gootam' of two to four annas per seer of 26½ tolas, *i.e.*, 3 to 6 annas per pound is paid. The broker may also arrange purchase on credit for his customer from the Bangalore merchant. When that is done interest from 10 to 12 per cent. is charged. When a large purchase is required, the broker is useful in giving up to date information about the trend of prices and renders service for the commission he gets, though at present prices, the rate of 'gootam' is probably excessive. If the owned capital of the silk merchant does not suffice for financing the reeler as well as the purchaser, he raises money in the local money market from a shroff or a joint stock bank at 8 to 10 per cent. Generally credit is allowed for short periods so as to enable an early adjustment of the account of the reeler. When personal delivery is not taken by the purchaser and the transaction is settled by correspondence, silk is sent out in bales of 70 pounds or 105 to 108 seers of 26½ tolas each. The marketing organisation in Kollegal differs from the Mysore organisation in this that silk is bought outright by the Kollegal merchants at current market prices on receipt of orders from South India and no commission work is undertaken. Commission is replaced by profits probably at a higher rate in order to cover the extra risk involved. Some Kollegal silk however reaches the consumer through the central Bangalore market. So that what we have said about Mysore is also to some extent true about Kollegal.

Marketing organisation in Bengal.

140. In Bengal very little work is done on a commission basis, most of the sales by reelers being outright purchases by merchants on which the risk is said to be shared by the merchant and the reeler. The silk trade there is in the hands of Marwari merchants in Malda and Murshidabad called *Arhatdars*. In Malda, they get quotations for Canton steam filature silk through their agent at Conjeevaram and fix the selling price of a standard variety of Bengal silk in Conjeevaram at 8 annas per local seer of 72 tolas above that rate. A contract is entered into with the reeler on the basis of that rate. If the ruling price in Conjeevaram of Canton steam filature silk is Rs. 8-6-0 per seer of 72 tolas, the Malda merchant can afford to pay a price of Rs. 8-14-0 per seer of 81 tolas

to the local reeler. This means that when the price of Canton steam filature silk at Conjeevaram is Rs. 4-11-0 per pound, the Malda merchant can afford to pay to the reeler about Rs. 4-8-0 per pound, the difference of three annas per pound being apparently his charge for profit and expenses. This margin covers a commission of 1 per cent. (presumably when business is done on a commission basis) and $\frac{1}{8}$th per cent. for charity, *i.e.*, about 9·7 pies per pound for both items, incidental expenses of Rs. 4 for $1\frac{1}{2}$ maunds or 6·4 pies per pound and freight which for passenger train by which most of the silk is sent, is about Rs. 11-4 per maund or about 2 annas 3 pies per pound from Malda to Conjeevaram. It will be clear from this that selling expenses are lower than those of Mysore while the freight factor is higher, the charges under this head from Bangalore to Conjeevaram being 6·4 pies per pound. It does not appear that any insurance charges are paid either in Bengal or Mysore. The Malda reeler generally receives an advance of Rs. 400 to Rs. 500 free of interest from his merchant for buying his raw materials after entering into a contract to sell his goods to him. Evidence is conflicting whether this results in a lower market price to the reeler or merely in the first option of buying at the current market price to the merchant, but the probabilities, based on our experience elsewhere, are that the former is the case. The *arhatdars* of Beldanga and Jangipur in the Murshidabad district charge 12 per cent. interest for such advances and further get their supplies of silk at less than market prices. The reeler further pays some brokerage, where he puts the sale through a broker, which must therefore be deducted from his gross selling price in order to arrive at his nett return. When Bengal silk is sent for export to Calcutta, the *arhatdars* consign it to their Calcutta commission agents after putting on a commission of 2 per cent. on Murshidabad silk and 1 per cent. on Malda silk. The Calcutta commission agents in their turn charge 2 per cent. on the price contracted with the exporting firms.

Selling methods in Kashmir.

141. At present the principal markets for Kashmir silk are Benares, Amritsar and Surat. The freight from Rawalpindi—the nearest Kashmir railhead—to Benares, the biggest market, is Rs. 4-0-7 per maund or 9·6 pies per pound. From Jammu the freight is 1 anna $3\frac{1}{2}$ pies per pound by passenger and $8\frac{1}{2}$ pies by goods train. For Surat the most distant market, the freight from Jammu is 1 anna 9 pies by passenger and $10\frac{1}{2}$ pies by goods train, while for Amritsar the nearest market, the corresponding rates are 5 pies and $1\frac{1}{2}$ pies respectively. Most of the silk is sent by passenger train as being the safer and quicker method. A slight charge of less than a pie per pound is incurred in sending the silk from the factory to Jammu station by tonga. Freight is paid by the consumer, but insurance charges amounting to 3 annas per Rs. 100 are paid by the State. Besides this item, a commission of $1\frac{1}{2}$ per cent. or roughly 1 anna 11 pies per pound is paid to selling agents—two in India and three in Europe—except to the London agents who receive 1 per cent. Goods are not consigned to the

Indian agents but are sent direct to the customers booked by them through a collecting bank. Goods for Europe are actually despatched to the agents, but previous approval of the Director is obtained for the rates at which sale is effected.

Defects of marketing organisation.

142. Marketing organisation in Assam, Bihar and Orissa and Central Provinces for selling the different kinds of silk they produce follows more or less the same lines as those described for Bengal with this difference that the markets being localised, there are more direct sales by the producer and being uncertain and small, there is more commission for the middlemen when their services are required. On the whole we get an impression from this survey that marketing is conducted, except in Kashmir, on expensive and primitive lines. There is room for fraud, misrepresentation and exploitation at various stages, owing to different weights, lack of finance and marketing ability and the peculiarity of moisture absorption possessed by silk which changes its weight with different degrees of moisture. These defects have been sought to be removed by co-operative societies in Bengal and Mysore, but there are only two or three such societies, one in Malda, another in Mysore and they do not seem to be in a flourishing condition.

Costs of marketing.

143. The costs of marketing given in the preceding pages may be roughly summarised by saying that the price of Indian silk, after it leaves the reeler, is put up on the average about 3 annas per pound after it reaches the consumer. This is seen from the following Table of costs per pound:—

TABLE LXII.

	Commission, etc.	Freight to principal distant market.	Insurance.	Total.
	A. P.	A. P.	A. P.	A. P.
Jammu silk .	1 11	1 3½*	0 1½	3 4
Mysore silk .	3 0	0 6⅓†	...	3 6⅓
Bengal silk .	0 9¾	2 3†	...	3 0¾

Bengal labours under the greatest disadvantage as regards freight charges, its markets some time back being as far apart as Conjeevaram, Surat and Amritsar. What Mysore gains on freight, it loses on an excessive rate of commission. Kashmir occupies a middle position in respect of both these items. As we shall see later freight does not play any important part in determining the competition between Indian and foreign silk, since the principal markets Bangalore, Kumbakonam, Conjeevaram in the south and Benares in the north are practically equidistant from the principal importing ports of Bombay and Tuticorin and their principal centres of supply. Kashmir and Bengal appear to labour under some handicap in this respect in relation to Surat and their south Indian markets, but this is not serious, since the costs of transport are so small in relation to the price that they may be safely left out of account. The fact that silk is sent by passenger train in preference to the cheaper goods train and that Bengal manages to put down its silk in Conjeevaram cheaper than Mysore shows that this conclusion of ours is legitimate.

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* To Benares.

† Conjeevaram.

Quantity and value of imported silk.

144. The quantity and value of imported silk since 1914-15 are given in Table LXIII and its source of origin is indicated in Table LXIV for the last 4 years.

TABLE LXIII.

Imports of Silk—Raw.

Year.	By land through Burmese frontier lakhs of lbs.	By Sea.						
		China including Hongkong.			Other countries.		Total.	
		Quantity lakhs of lbs.	Value Rs. lakhs.	Average value per lb.	Quantity lakhs of lbs.	Value Rs. lakhs.	Quantity lakhs of lbs.	Value Rs. lakhs.
				Rs.				
1914-15 .	..	19·7	98·9	5·0	3·3	14·5	23·0	113·4
1915-16 .	..	20·5	101·4	4·9	1·9	6·5	22·4	107·9
1916-17 .	..	17·0	100·1	5·8	2·6	9·8	19·6	109·9
1917-18 .	..	16·0	106·0	6·6	2·3	10·1	18·3	116·1
1918-19 .	..	12·5	92·2	7·3	1·8	10·5	14·3	102·7
1919-20 .	..	22·8	174·4	7·6	·6	2·8	23·4	177·2
1920-21 .	..	17·2	145·3	8·3	2·1	17·9	19·3	163·2
1921-22 .	..	15·5	128·3	8·2	·5	3·9	16·0	132·2
1922-23 .	..	17·1	147·4	8·6	1·2	10·5	18·3	157·9
1923-24 .	..	12·8	107·1	8·4	·9	11·0	13·7	119·1
1924-25 .	..	11·7	99·5	8·5	2·4	19·5	14·1	119·0
1925-26 .	..	12·5	90·5	7·2	·7	3·8	13·2	94·3
1926-27 .	3·9*	17·4	110·1	6·3	·4	3·6	17·8	113·7
1927-28 .	3·5	22·7	141·0	6·2	·9	4·3	23·6	145·3
1928-29 .	2·9	18·7	118·8	6·3	2·6	12·8	21·3	123·6
1929-30 .	3·8	21·0	120·0	5·7	·7	3·1	21·7	123·1
1930-31 .	3·4	19·2	87·4	4·5	·2	·6	19·4	88·2
1931-32 .	3·9	15·3	61·3	4·0	·3	1·0	15·6	62·3
1932-33 .	4·4†	29·3	110·2	3·8	2·6	6·9	31·9	117·1

* The values of land imports are not available The total values therefore represent values of sea imports only.

† 10 months' figure.

TABLE LXIV.

Imports of Raw Silk into India by Sea.

	Hongkong.		Siam.		China.		Japan.		Other countries.		Total.	
	Quantity lakhs of lbs.	Value lakhs of Rs.	Quantity lakhs of lbs.	Value lakhs of Rs.	Quantity lakhs of lbs.	Value lakhs of Rs.	Quantity lakhs of lbs.	Value lakhs of Rs.	Quantity lakhs of lbs.	Value lakhs of Rs.	Quantity lakhs of lbs.	Value lakhs of Rs.
1929-30 . .	1·4	7·2	·1	·3	19·6	112·8	·4	1·6	·2	1·2	21·7	123·1
1930-31 . .	3·0	12·1	..	·1	16·2	75·3	·2	·6	..	..	19·4	88·1
1931-32 . .	1·7	6·0	..	·1	13·6	54·6	·3	1·6	..	..	15·6	62·3
1932-33 . .	Included in China.		..	..	29·3	110·2	1·7	4·7	·9	2·1	31·9	117·1

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It is clear from these figures that nearly all the imports whether by land or sea come from China. The imports from Hongkong also really represent Chinese imports. There are also some amounts received from Japan and other countries, but these are negligible. There is a tendency for the Japanese imports of raw silk to increase, though hitherto that country has preferred to send its silk in the shape of goods. It was aserted before us by the Japanese and Shanghai Silk Merchants Association that some Chinese silk is smuggled on pack animals across the Kashmir and Tibetan frontier into Amritsar, but we cannot say how far this is true. Some silk from Yarkand in Chinese Turkestan, according to the Punjab Government, is used in Amritsar, but there is no record of it in the land frontier customs statistics, nor is any mention made in them of Bokhara silk which figures so prominently in the Indian Customs Tariff with the highest tariff value of Rs. 12 per pound. Perhaps the amounts involved are so insignificant that it has not been thought worth while to keep any record of them or smuggling is so common that no record is possible. The figures of imports given above do not disclose anything abnormal over a number of years. The only interesting feature is the abnormal imports of Chinese and Japanese silk in the years 1932-33 and the serious decline in average value which has occurred in the last 3 years. Otherwise the silk imports were normal. The decline in Chinese imports in the years 1930-31 and 1931-32 was matched by what occurred in the preceding years from 1923 to 1926 and the increase in the year 1929-30 had its parallel in the increase in the year 1919-20.

Customs classification of imported silk.

145. Imported silk is classified by the Indian Customs Tariff according to place of origin into Bokhara, Persian, Siamese and Chinese silk. The last is sub-divided according to the place of shipment or production such as Mathow, Panjam, Shanghai and other kinds. The classes comprised in the last two are again distinguished from each other by port of shipment, colour and quality and designated as White Shanghai, Dupion, White Shanghai other kinds, White other kinds, Yellow Shanghai, Yellow other kinds. The whole classification is mysterious and confusing and combined with the system of tariff values has been responsible for undertaxation of some varieties of silk and overtaxation of others. It has diverted the current of trade from the cheaper varieties like Panjam and Mathow to the dearer kinds like the Canton steam filature which compete keenly with Indian silk and has thus caused serious hardship to the indigenous silk industry. It has certainly added greatly to the difficulties of our enquiry. For some time, we could not trace in the Customs Schedule with its picturesque descriptive variations from white to yellow and Shanghai to other kinds, the imported silks known to the trade and to the weavers which were competing with the indigenous products. We need not emphasise the fact that these designations are utterly unknown to the trade except the 3 or 4 large importers who monopolise the trade in raw silk. Yellow

Shanghai, for instance, is not a homogenous group of silks, but includes silk of the highest quality produced in power filatures priced at Rs. 5-8 per pound, superior re-reeled silk and silk of the coarsest kind reeled on Chinese charkhas priced as low as Rs. 2-15 per pound. And yet these different qualities of silk are grouped together and pay duty at a fixed tariff value of Rs. 4 per pound, because they all happen to be yellow and are shipped from Shanghai. It would be equally confusing to classify Indian cotton cloth imports into Spanish, Italian, Japanese and British, and sub-divide British into Hull, Bristol and again sub-divide Liverpool into White Liverpool muslin, White Liverpool other kinds, White other kinds (Glasgow), Grey Liverpool and Grey other kinds. We understand representations were made by the Bangalore Silk Filature as far back as 1926 and later by the Mysore and Madars Governments, protesting against the inequity and inconvenience of this illogical classification but no heed was paid to them and they were rejected, we are convinced, without adequate examination. Even at the present moment, much avoidable hardship is being caused to the silk reeling industry, because Canton steam filature silk included in the mysterious Tariff class " White other kinds ", which is driving out all Indian silks from their accustomed markets, is paying duty on a tariff value of Rs. 3-4 while its *ex*-duty value is Rs. 3-11 per pound. It would thus appear that to this extent Chinese silk has the double advantage of receiving an indirect bounty from the Indian as well as the Chinese Government.

Our recommendation for tariff values.

146. We have ascertained from the Director General of Commercial Intelligence and Statistics the method by which tariff values are fixed. They are revised at the end of each calendar year and the revision is based mainly on the average of the market prices reported monthly by the five major Custom Houses for the twelve months October to September preceding. These monthly prices are themselves averages of the prices of the various descriptions and qualities of articles covered by a tariff valued head imported at the particular port and naturally they differ from port to port. For the purpose of fixing tariff valuations the Director General takes twelve months' averages for the five major ports and they are weighted according to the importance of the trade in each article at each port. The weighted averages and the customs proposals together with any information that may be available regarding future course of prices are then examined by the Director General in a conference which is attended by the head appraisers from each of the major Custom Houses and provisional rates of tariff values for the following year are formulated. These proposals are then circulated for criticism to various Chambers of Commerce and Associations. The commercial bodies at Madras, Karachi and Rangoon forward their criticisms to the Director General through the respective Collectors of Customs, while those at Calcutta and Bombay are given an opportunity to discuss the rates personally. The procedure at that meeting is that if a particular provisional rate is contested and satisfactory arguments and documentary

evidence are produced to prove that the proposed rates would be unfair, the provisional rate is examined again and necessary modifications made before the Director General's recommendations are sent to the Government of India. We ascertained in the course of a discussion with the Collector of Customs, Bombay, the system which is followed by the Collectors of Customs at the major ports in making their proposals for the revision of the tariff values. It appears that at Bombay market prices are obtained only from the large importers without consulting the manufacturers, the other interested party in the trade and that the market prices thus supplied include ½ per cent. brokerage and ¼ per cent. commission, while the prices submitted from the other ports do not include these items. We think that such a procedure is faulty and liable to error or abuse. In these days of violent exchange fluctuations the market values of imports change so rapidly that within a short time they cease to have any relation to the tariff values fixed for assessing the duties. It was therefore suggested by the Mysore representative that the tariff values should be revised at shorter intervals than one year while the Kashmir representative suggested taking the averages of preceding three to four years. The Director General of Commercial Intelligence and Statistics however foresees practical difficulties in adopting such a procedure. On the whole there is a general agreement among importers and manufacturers that the present method of classifications and tariff valuation has caused serious injury to both parties. About the classification we make detailed recommendations in the following paragraph and as regards the tariff values we recommend that they be abolished altogether. We anticipate no administrative difficulty if our proposals for a specific duty contained in Chapter XIII are accepted. Wherever the *ad valorem* duties are applicable we recommend that they should be assessed on the correct invoice value.

Our suggestions for the reclassification of silk impotrs.

147. Our observations in paragraph 145 will be better understood, if the following Table showing in detail the principal varieties of Chinese silk with their tariff values and market prices and the proportions in which they enter Bombay, the chief port for raw silk, prepared at our special request by the Collector of Customs there, is examined.

TABLE LXV.

Statement showing different qualities of Chinese Raw Silks, their market values and percentage.

Quality.	Market value per lb. Rs. A.	Approximate percentage on sub-kind.	Approximate percentage on total import.	
SHANGHAI YELLOW.				
Tariff Value Rs. 4 per lb.				
Minchow Filature Superior	5 8	18	7	
Minchow Filature Common	4 8			
Kubin Re-reeled	5 0			
Minchow Re-reeled	4 6 to 4 8			
Mienyan Re-reeled	4 7			
Inferior Re-reeled	2 4			
Minchow Long Reel Native	3 8			
Kubin Long Reel Native	3 6	10	4	38
Tsingchow Long Reel	3 10	10	4	
Lie Mienyang	2 15	50	20	
Hoyung	3 10	12	5	
YELLOW OTHER KINDS.				
Tariff Value Rs. 3-5 per lb.				
Kath	4 4	80	5	
MATHOW.				
Tariff Value Rs. 2-8 per lb.				
1st Quality	2 2	50	1¼	2½
2nd Quality	2 0	50	1¼	
PANJAM.				
Tariff Value Rs. 1-8 per lb.				
Soso No. I	1 2	50	1¼	2½
Soso No. II				
Canpass	1 8 (avg.)	50	1¼	
WHITE SHANGHAI THONKOON OR DUPION.				
Tariff Value Rs. 2-12 per lb.				
Shanghai Dupion Filature	3 8	40	6	15
Shanghai Dupion	2 6	60	9	
WHITE SHANGHAI OTHER KINDS.				
Tariff Value Rs. 4-4 per lb.				
Fanchow White	3 10	30	6	14
Kabadia White	3 13	20	4	
Kahing	4 4	20	4	
Tsatlee Short Reel	4 11	30	6	
WHITE OTHER KINDS.				
Tariff Value Rs. 3-4 per lb.				
Canton Filature	4 8	40	6	15
Canton Long Reel or Saisee	3 4	60	9	

It is evident from this that Chinese silk instead of being classified according to colour and port of shipment, should be classified according to quality which should reflect the result of a distinct process of manufacture or of the use of different types of cocoons. The difference in process of manufacture or difference in the kind of cocoons used gives rise to distinct commodities which ought not to be lumped together for the purpose of tariff values or of comparison with Indian silks with a view to arrive at the measure of protection needed. In estimating the extent and intensity of competition, if possible, like must be compared with like in order to arrive at a true result. Simple averaging of import prices, besides being inaccurate and unscientific, would result in an excessive amount of protection, if the cheapest imports arriving in insignificant quantities are given the same weight and importance as the more expensive and representative imports. To avoid this result, we first propose to reclassify all silk imports into the following four classes:—

I. Steam filature silks, *i.e.*, silks reeled on modern power machines corresponding to Indian filature silk.

II. Re-reeled silks, *i.e.*, silks which after having been reeled on hand machines have undergone a further process of re-reeling adding to the cost. These correspond to Indian re-reeled charkha silks.

III. Native reeled silks, *i.e.*, silks reeled on hand machines without any further process corresponding to Indian charkha silks.

IV. Waste products and dupion hand reeled silk, *i.e.*, silk reeled from double cocoons, rejected cocoons and other waste products.

There is no Indian equivalent for these silks as owing to absence of sorting and grading India has not yet learnt to utilise its waste products. These silks are generally used for sewing thread and making cotton sari borders and do not directly compete with Indian silks, which as said above, are used in the main body of a cloth piece. According to this scheme based on differences in the manufacturing process and not on colour and port of shipment, the various items in the Bombay Customs Collector's list are rearranged as follows:—

TABLE LXVI.

Quality.	Ex duty value per lb.	Present market value per lb.	Percentage of total imports.
	Rs. A.	Rs. A.	
I.—*Steam filature.*			
Minchow filature—			
Superior	4 8	5 8	
Common	3 8	4 8	
Canton filature	3 11	4 8	6
Shanghai Dupion filature .	2 13	3 8	6

Quality.	Ex duty value per lb.		Present market value per lb.		Percentage of total imports.	
	Rs.	A.	Rs.	A.		
II.—*Native re-reeled.*						
Kubin R. R.	4	0	5	0		
Minchow R. R.	3	8	4	6		
Mienyong R. R.	3	7	4	7		
Mienyong inferior	1	4	2	4	1	
Tsatlee R. R.	3	10	4	11	6	
III.—*Native hand reeled.*						
Minchow L. R.	2	8	3	9		
Kubin L. R.	2	6	3	6	4	
Tsingchew L. R.	2	10	3	10	4	
Lie Minyong	1	15	2	15	20	
Hoyung	2	10	2	10	5	
Kath	3	7	4	4	5	
Fanchow White	2	9	3	10	6	
Kakadia White	2	12	3	13	4	
Kahing	3	3	4	4	4	
Canton L. R. or Saisee	2	7	3	4	9	
IV.—*Waste products and Dupion silk.*						
Mathow, 1st quality	1	9	2	2	1¼	14
Mathow, 2nd quality	1	7	2	0	1¼	
Panjam Soso No. I	0	12	1	2	1¼	
Panjam Soso No. II						
Campass	1	2	1	8	1¼	
Shanghai Dupion	1	11	2	6	9	

It is inevitable that there should be some intermediate varieties which cannot be assigned to any particular group. For instance Shanghai Dupion filature silk is undoubtedly produced from waste double cocoons but being reeled in a power filature, it has been so improved that it competes with 2nd and 3rd quality charkha silks. For the purpose therefore of estimating the competition between Indian and Chinese silk, though not for tariff classification which must be based on objective physical standards recognisable by an appraiser, it should be put in Class III as midway between Classes I and IV. Again, Mienyang inferior R. R. though re-reeled, on examination appeared to us to be produced from rejected cocoons, and should therefore be relegated for comparison purposes to Class IV. The position of Lie Minyang in the list appears to us to be higher than its quality deserves, but we are doubtful and therefore retain it where it is.

Qualities of imported silk competing with Indian silks.

148. After this reclassification we are in a position to determine which qualities of imported silks compete with Indian silks. Kashmir and Bangalore filature silk is distinctly superior to the imported filature silks but though quality for quality there is no comparison, in these days of reduced purchasing power, the weaver tends to substitute the cheaper imported

filature silks for the dearer home product. Against the first quality charkha silks of Bengal and Mysore, the Chinese filature and re-reeled silks, specially Canton steam filature and Tsatlee re-reeled, compete more directly. Japanese filature silk being distinctly superior is not comparable to any Indian charkha silk. The Indian silks are inferior to the foreign ones in point of winding quality but as they possess superior lustre and tensile strength, they fetch on the whole 4 to 8 annas per pound more in price in open competition; but here again consideration of cheapness prevail. Shanghai and Japanese filature dupions and all the Native reel Chinese silks except the coarsest varieties compete directly with the 2nd and 3rd class Indian charkha silks and it is here that the competition is the keenest. About 61 per cent. of the Chinese imports belong to this class and 50 per cent. of Indian production is of the 2nd and 3rd class variety. The 4th class of Chinese silks made from rejected or dupion cocoons by hand do not compete with any class of Indian silk, as they are mostly used as sewing thread and sari borders for which there is really no suitable Indian substitute. They used to go in larger quantities to Punjab before when silk embroidery was more fashionable, but now they form a small and diminishing part of the total imports. They are being slowly driven out by the competition of foreign artificial silk which makes a more effective substitute. The comparison between Indian and foreign silk may be summarised in the following Table:—

TABLE LXVII.

I. Chinese and Japanese filature silk.	Competes with	I. Indian filature silk.
II. Chinese filature silk	,,	I. Indian filature silk.
III. Chinese re-reeled silk	,,	II. Bengal and Mysore 1st quality charka silk.
IV. Native reel silk including Japanese and Shanghai filature dupions.	,,	III. 2nd and 3rd quality Bengal and Mysore charka silk.
V. Chinese waste products and ordinary dupion silk.	Does not compete directly but may compete indirectly as a cheaper substitute like spun or artificial silk for real silk owing to reduced purchasing power.	

Price of imported silk in the Indian markets.

149. Imported silk enters India mainly through Bombay and Tuticorin. Tuticorin and Madras meet the demand, though not entirely, of southern India, while Bombay caters for the needs of the whole country, specially western and northern India. Bengal still prefers its own silk, but, outside it, Canton steam filature—the brand which sells best at present—has penetrated everywhere. It has driven out Bengal silk entirely and Kashmir silk partly from the Benares, Amritsar, Surat and Nagpur markets. It has a strong hold on the Bangalore and Kumbakonam markets. As in the case of Indian silks, the freight, insurance, handling and other charges from Bombay to the principal markets will not exceed 3 annas a pound, so that if the Canton steam filature silk

sells in Bombay at Rs. 4-8-0 a pound, it can be sold at Rs. 4-11-0 a pound in Bangalore or Conjeevaram. The freight charges compared to the total price are small, as we have said before, and may be safely neglected when comparing the price of foreign silk with that of Indian silks, specially when the principal markets in the country are so situated that the advantage of proximity of the Bengal, Kashmir and Mysore centres of Indian production to their respective home markets in Bengal, Punjab and Mysore is neutralised by the similar advantage enjoyed by foreign silk in the shape of the proximity of Bombay, its principal port of import, to the Gujarat and Maharashtra markets of the Bombay Presidency, while each of the distant markets such as Benares, Belgaum, Kumbakonam are practically equidistant from the nearest point of import and its principal centre of Indian supply. Commission, brokerage, handling and other charges are also practically the same in the two cases. The Bombay importers generally sell their goods for cash to commission agents, with or without the help of brokers, and these in their turn consign the goods to their mofussil customers in the principal centres of distribution or production. In this respect, the commission agents and brokers at the ports are the exact counterparts of the commission agents and brokers at Bangalore or Malda whom we have described before and their commission, insurance and other charges are roughly the same, *i.e.*, 1½ to 2½ per cent. Thus foreign silk enjoys no special advantage or suffers from no special disability in freight and other charges in competing with Indian silk in distant markets.

Reasons for the low prices of imported silk.

150. We have already described to some extent the reasons for the low price of imported silk in Chapters I and II, but we might repeat them here for greater convenience. We have no first hand knowledge of the conditions existing in China, and we cannot, therefore, speak about them with the same confidence, as we can about conditions in India; but from what we have read about them, we can say that labour conditions in China are not worse than what they are in Bengal, Mysore and Kashmir. If anything they are better. For judging from the costs of production prevailing in South China in 1927 and 1931 (we have no later information than that), the wages and profits of silk worm rearing are normally higher. Bengal may claim the same fertility of soil as is found in China though perhaps not the same temperate climate. The organisation of production in China is not necessarily more efficient nor is State assistance rendered on the scale of that in Mysore, but China is the greatest producer of silk in the world after Japan and has naturally a longer experience and a surer tradition of the successful working of this industry. It is therefore probable that her rearing methods are more efficient. The Central China worms being univoltine are obviously superior to our Mysore and Bengal worms, but the South Chinese multivoltine worms are not. As regards reeling of silk there is no comparison between the modern methods mostly pursued there in imitation of Japan, with the primitive methods still followed in India. There are at present two international associations, one at Canton and the other at

Shanghai, working for the improvement of the industry, and they have taken as their model Japan where students are sent for training. It is therefore a reasonable conjecture that on the whole, the industry is better conducted in China than in India. But this advantage was till recently, largely neutralised by absence of settled Government, a burdensome export duty and lack of assistance from the State. There has been a change for the better in all those respects. There is now more order, the export duty amounting to 17½ Canton dollars per picul of 133 pounds was abolished last year and a special duty on the import of artificial silk has been levied to finance the development of the industry.

Other competitive advantages.

151. If this were all, India would have had nothing to fear for though the Indian industry has lost its foreign market, it has still its home market which it has supplied from time immemorial. Chinese competition in it was not a serious factor so long as China mainly supplied the cheapest waste product silks produced by the sweated labour of old women for which India has no substitute. The character of Chinese imports however changed after 1910 or so, when she began to send more and more of her better qualities of filature and re-reeled silks for use as warp, but against this must be set the fact that Kashmir steadily increased its exports to Europe about this time. Chinese competition inside India became only serious during the last 10 years when a falling exchange favoured her imports and has become deadly in the last three years, when the loss of the American market and the State bounty we have referred to in Chapter II, has completed what depreciating exchange had begun. We are convinced that the superior qualities of silk which was exported to India in such large quantities in the years 1931-32 and 1932-33 were sold at uneconomical prices, not as a result of a set policy to capture an outside market, but as the only possible way of getting rid of large stocks which had accumulated as a result of excessive production and the sudden contraction of the American and European demand. We cannot believe that China can afford to go on selling at these prices indefinitely, unless she has overhauled her costs of production so completely that the price of cocoons has become completely adjusted to the prevailing price of raw silk. We have no authoritative information to settle this point one way or the other, but all probable indications point to the fact that China will again turn to America and Europe as more paying markets, when the demand there rises again.

The exchange factor.

152. How the exchange factor has helped her from 1923 onwards has already been described in paragraph 29 and is clear from the Table of Shanghai exchange given there. Since September, 1931, the exchange factor on the whole has been moving against her silk exports to India and may be expected to move still more against them, if the expected rise in silver takes place as a result of discussions at the forthcoming World Economic Conference. In fact but for the fall of the American demand and the bounty referred to in para-

graph 30 which was paid about April, 1932, the rise in exchange from that month to the present day would have restricted the imports of Chinese silks into India. State assistance and the world fall of demand has thus been mainly responsible for their increase in spite of an adverse exchange.

Competition of artificial silk with natural silk.

153. The Chinese competition is not the only thing which is undermining the position of the Indian silk industry. The competition from China may be temporary but the competition from the artificial silk goods is more or less permanent. In this India does not stand alone but shares the misfortune with the rest of the world. In Lyons, London and New York as we described in Chapter II, artificial silk is being put to many uses for which formerly only natural silk was used. We have seen in Chapter X how largely the weaver has taken to artificial silk. Even where the disadvantages of artificial silk—its fading after long exposure and washing—are fully recognised, its remarkable cheapness in times of reduced purchasing power makes an irresistible appeal. Where fashions of dress change rapidly, durability and washing qualities are not such strong points as economy and bright appearance. Artificial silk satisfies these points in a measure in which no other fabric can. Whatever be its merits as against natural raw silk, there is no doubt that artificial silk is a formidable rival of spun silk. This has affected the price of silk waste which India used to export in such large quantities. The profits of reeling have been correspondingly reduced. As long as no profitable use is found for this by-product of the silk industry, its depression due to this indirect competition of artificial silk should be regarded as permanent.

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CHAPTER XII.

The Case for Protection.

Sericulture an old established, not a new industry.

154. The sericultural industry differs from the majority of other industries whose claims for protection we have examined hitherto in that it is not an infant industry, but as shown in Chapter II has been practised in India for the last two thousand years. The problem which we have to investigate is not whether a new industry can come into being with the help of temporary protection but whether an old industry for which the country has been justly famous can by its help be saved from extinction, threatened by dumping or other devices to which various nations have resorted in an increasing measure in the present depression. A meticulous examination of the resources of the industry in raw materials, power, labour, etc., which is generally required by the Fiscal Commission in the case of infant industries is, therefore, not strictly necessary. The fact that the industry has lasted so many years, is still alive and supplies even now about half the total requirements of the country is *primâ facie* evidence that these resources exist. The only thing which requires careful investigation in assessing the claim of the industry for protection is whether it has a reasonable prospect of adopting the latest technical methods and receiving the Government assistance which have so enormously improved the competitive power of the Japanese and European industry. We shall therefore examine this question at length and touch on others in less minute detail.

A political objection answered.

155. Before we do so, however, we wish to examine an objection which has been advanced on political grounds, though it was not pressed in oral examination, by Bombay silk importers against the claim for protection advanced by the Mysore Government. It was urged that the industry is mostly confined to the two States of Mysore and Kashmir and as such has no claim for protection from and at the expense of British India from which they are politically distinct. It will be seen, however, from the Table of production given in paragraph 32 that British India in spite of the decline of its sericultural industry still accounts for about half the total Indian production of silk. However, even if no silk were produced in British India, we think the Indian States would be perfectly justified in claiming protection for their threatened industries. They shoulder a number of centrally imposed burdens and it is only proper that they should enjoy some of the common benefits. In particular they bear their full share of the Imperial Customs without having a voice in their imposition under the present constitution. Their right to get their industries protected by suitable

adjustments in the Indian Customs schedule was expressly conceded by the Fiscal Commission, when they advanced a claim for special representation on the Tariff Board. Indeed this concession was illustrated by the following reference to the very industry whose claim to protection we have been asked to investigate:—

> "It is, however, conceivable that in certain cases the main interest of an industry may be centred in an Indian State. We were informed, for instance, that the Mysore State had a predominant interest in the sandalwood oil industry, and it seems probable that the production of raw silk is a matter of more importance to the States of Mysore and Kashmir than to any other parts of India. In such cases the industry concerned should have exactly the same opportunities for representing its case before the Tariff Board as industries in British India, and we are sure that these representations would receive from the Tariff Board the same careful attention as the representations made by industries located in British India."

General advantages of the industry.

156. The industry has great natural advantages. A large portion of India lies in the "silk belt" mentioned in paragraph 4. The economic environment, *i.e.*, low agricultural wages and long periods of unemployment in rural areas and the need of a subsidiary occupation, is entirely favourable to silkworm rearing. It is distinctly less exacting and more remunerative than charkha spinning which has been so repeatedly advanced as a remedy for agricultural unemployment. There is no serious competition from other crops and occupations. The returns from them all over India in the present depression are, if anything, lower. Moreover, mulberry can be grown on waste lands and field boundaries if the tree method of cultivation is adopted. In seed production and in its later stages of reeling, throwing and weaving by power, the industry is capable of absorbing some of the educated classes whose unemployment constitutes a serious problem for all provincial Governments.

Special advantages. Climate.

157. Cocoons are the raw materials of the silk industry. In order to understand India's advantage in this respect we must consider what facilities exist in this country for rearing silk worms and growing their food. As we have pointed out before, both require a suitable climate. The climate of those parts of India in which sericulture is at present carried on is pre-eminently suitable both for the cultivation of the mulberry and for the rearing of the silkworms. The climate of Kashmir is such as to enable the industry to be carried on under conditions similar to those in Europe. The history of sericulture in Bengal proves that the climate presents no difficulty to the practice of sericulture. It is generally laid down that the most suitable temperature for the rearing of silkworms is between 75° F. and 80° F., with humidity between 50 and 70 per cent. But with proper care worms can be

reared successfully in temperatures with a wider range of variation. Thus the maximum and minimum temperatures in the principal rearing seasons of Japan compare as under with those in Mysore City which may be regarded as typical of the portions of the State in which sericulture is practised.

TABLE LXVIII.

Country.	Season.	Temperature.			Humidity.		
		Maximum.	Minimum.	Average.	Maximum. per cent.	Minimum. Per cent.	Average. Per cent.
Japan	Spring	78°F	65°F	70°F	94	50	75
„	Autumn	88°F	75°F	82°—83°F	90	50	80
Mysore	..	95°F	65°F	72°F	90	30	50

The Table above shows a wider range of temperatures in Mysore than in Japan; but in spite of this we believe that the climate of the greater part of the Mysore State is well suited to the industry. We have in Chapter II referred to other parts of India where climates are suitable to which the industry can be extended with advantage. We are thus satisfied that the climate of great portions of India affords facilities for the cultivation of mulberry and for the rearing of silkworms.

Mulberry.

158. For the production of the cocoon, from which the silk is obtained, it is necessary to cultivate the mulberry. In Chapter IV we have seen that the mulberry grows well either as tree or as bush in all parts of the country where sericulture is practised. The yield of leaf is especially heavy on the fertile soils of Bengal and Bihar; but even on the drier uplands of Mysore and Kollegal, though the yield of leaf is not so bountiful, both tree and bush repay cultivation.

Silkworms.

159. We have explained in Chapter III that though there are other varieties of silkworms in many parts of India, we have restricted our investigation to the mulberry silkworm and based our recommendations solely on the prices of mulberry silk which is almost the only silk known to the world market. It is only in Bengal—with small extensions to Assam and to Bihar and Orissa—and in Mysore with

the Kollegal taluk of Madras—that indigenous races of mulberry silkworms have been established. The race which in former times was established in Kashmir has been exterminated by disease and that State is still dependent on seed imported annually from Europe. Efforts are however being made to establish some of the European races in Kashmir; and the quantity of locally reared seed distributed to rearers is increasing every year. We do not consider that Kashmir's dependence upon imported seed is such a serious handicap as to render the industry ineligible for protection. We regard it as a purely temporary handicap which is rapidly losing importance, as more and more local seed is produced, and as the European races become acclimatised. We have satisfied ourselves that the cocoons produced by the indigenous Indian silkworms of Bengal and Mysore—though capable of improvement in respect both of the quantity and of the quality of their silk content—compare favourably with the cocoons produced in other countries. Most of the Indian races of silkworm are multivoltine, and any comparison between them and foreign univoltine or bivoltine races must necessarily be misleading. For the univoltine and bivoltine races always produce cocoons with a higher silk content than multivoltines. We have however seen in paragraph 46 that the advantage which the univoltine race derives from the greater silk content of its cocoon is outweighed by the capacity of the multivoltine races to produce five, six, or even seven broods a year. The conditions under which sericulture is practised in South China are not unlike those of India. The country is sub-tropical and the prevalent races of silkworm are multivoltine; the denier of the silk in the South China cocoons varies from 1·75 to 2·04 with an average of about 1·90, which is exactly the same as the denier of the silk in the cocoons of the Mysore race. The real test however of the quality of a race of silkworms is the nature of the cocoon which it spins. The average yield of cocoons from an "egg-sheet" in South China is fifty catties or 66·66 lbs. of dry cocoons. An "egg-sheet" contains about 2·7 ozs. of seed. So this yield may be taken as equivalent to about 27 lbs. of dry cocoons per ounce of seed used. In paragraph 82 we have given the average yield reported from various parts of India in terms of green cocoons. The Chinese yield at the rate of 81 lbs. of green cocoons per ounce of seed is superior to the average yield of any of the multivoltine races of India which ranges between 48 and 60 lbs. per ounce of seed. Though the average yield in India is low, very much better results have been obtained, the best of which we have heard being 143 pounds per ounce reported from Mysore. And we also find that the cross-breed races of Mysore are yielding at the rate of 70 to 81 pounds per ounce. Though in quantity the average yield obtained in India is inferior to that obtained in South China, the general average quality of the Bengal cocoon is said to be a little superior to the best Cantons. In paragraph 46 we have given a statement comparing the qualities of the different races of cocoons produced in India, and showing how the different governments are trying to effect improvement in them by hybridisation. We are assured that with its present organisation the sericultural industry in

Kashmir, the Punjab and Mysore is capable of expansion up to the limits shown in the following statement:—

TABLE LXIX.

Maximum production of cocoons and raw silk obtainable under the present organisation.

Province.	Cocoons. Lbs.	Raw silk. Lbs.
Kashmir	40,000,000	1,000,000
Jammu	3,600,000	250,000
Mysore	15,500,000	1,200,000
Punjab	22,800	6,400
Total .	59,122,800	2,456,400

We are unable to give similar figures for Bengal, not having been supplied with an estimate by the Bengal Government. But its past history proves that its production can be greatly extended and the statement shows that the other parts of the country are capable of producing sufficient cocoons to supply all the raw silk which is at present being used in India. We are satisfied that there can be no difficulty in any of the sericultural parts of India in producing all the cocoons for which there may be a demand. Thus the industry has the advantage of an abundant supply of its raw material.

Power.

160. We have found that in this industry power plays a much less important part than in other industries whose conditions we have had to examine. The Kashmir State, who employ electric power to drive the reels in their filatures, have found it to their advantage in saving expenditure and in improving the colour and lustre of their silk, to use steam instead of electricity to generate heat. Both in Kashmir and throughout that part of Mysore where the sericultural industry is established, electric power is available at prices which compare favourably with the charges made for power in other industries which we have investigated, the rate in Mysore being given as about 9 pies per unit if taken in large quantities. The silk districts of Bengal, though electric power is not available, are situated so near the coal-fields that power can be generated by steam at a cheap rate.

Labour.

161. We have mentioned that one of the great advantages of the sericultural industry is that it provides a useful and congenial subsidiary occupation for the small agriculturist. This is of special value in a country with such a large agricultural population as India. At present the greater portion of the reeling is done in villages where there is no lack of labour; we have seen in paragraph 96 that if more is required it can easily be trained in a short period; nor do we contemplate any difficulty in securing adequate supplies of labour for growing number of filatures. We have been informed that

the labour now employed in filatures both in Kashmir and in Mysore is on the whole skilled and intelligent and that while in some respects it is inferior to Italian labour, it is equal or superior to Chinese. Its defects can be remedied by better training and closer supervision. As regards wages we have seen that under the State monopoly in Kashmir the labour in the filatures is paid at rates higher than those obtaining in other industries in Kashmir, such as the canvas and carpet industries. But in other parts of India we are informed that the average wage paid to reelers is between seven and a half and ten annas a day. Thus whatever defects Indian labour may have are more than compensated even in Kashmir by the advantage of low wages. We are informed that typical wages paid to reelers in other countries are as follows:—

TABLE LXX.

Reeler's wages per day.

		Rs.	A.	P.
Japan	1·30 yen	1	8	0
China	·85 dollars	1	0	8
Italy	8 liras	1	9	7
France	10·25 francs	1	9	7

Market.

162. We have seen that India at present consumes about double the quantity of raw silk which she produces. Practically all the articles which are manufactured from imported silk can be made from Indian silk. This is only one direction in which the market for Indian raw silk might be extended. We believe that if the sericultural industry is to expand, the quality of its production must be improved for which purpose a number of power driven filatures must be opened. And to provide a market for the high grade silks produced by these filatures, we anticipate the opening of a number of factories for the manufacture of silk goods, and that a growing part of the silk mixtures and pure silk goods now imported from abroad will in future be manufactured in the country. That there is plenty of scope for the expansion of the industry in this direction is shown by the following figures giving the quantity of silk mixtures and silk goods imported annually.

TABLE LXXI.

	Silk mixtures. Millions of yards.	Silk piece goods. Millions of yards.
1927-28	2·4	21·3
1928-29	2·9	21·9
1929-30	3·0	22·9
1930-31	4·6	16·7
1931-32	5·1	19·9
1932-33	10·1	34·9

Moreover we should like to see factories established in India for the spinning of silk from silk waste and from pierced cocoons. At present all the waste except what is spun into *matka* by old women in Bengal is exported to foreign countries where it is spun, and much of it finds its way back to India in the form of "spun silk". The quantity of spun silk imported into Bombay alone has been:—

1928-29	66,418 lbs.
1929-30	137,838 ,,
1930-31	77,047 ,,
1931-32	105,404 ,,
1932-33	336,965 ,,

Though it has been reduced somewhat by the present depression and the competition of artificial silk, the market, even if we discount the possibilities of its regaining its old export trade, both for Indian raw silk and for its waste product would seem to be capable of almost immeasurable expansion. The decline of the industry has not been caused by the loss of any of the natural advantages which it has enjoyed in the past. We are satisfied that it still fulfils the first of the conditions laid down by the Fiscal Commission.

Second condition of the Fiscal Commission.

163. We are equally satisfied that the industry cannot exist without protection, much less develop rapidly as contemplated by the second condition of the Fiscal Commission. In the sericultural industry we are considering not so much a case of *protecting* a new industry struggling against old established rivals in other countries conducting their operations in a normal fashion under normal conditions, as one of *safeguarding* an old existing industry placed in grave jeopardy by the present world depression and unfair foreign competition, which requires some time to re-organise itself and adjust its costs to the new conditions. We are not thus investigating an industry under the normal and more or less permanent conditions envisaged by the Fiscal Commission. We are studying it at a time when the economic storm is blowing with full fury, upsetting all ordinary notions of exchange, costs, profits and fair selling prices, and when every nation in its attempt to shelter itself, is adding to the general confusion by exchange restrictions, import and export quotas, subsidies and bounties. At such a time of storm and stress, India, of all nations in the world, cannot afford to maintain an attitude of pathetic detachment, irrespective of the reactions which the general upheaval and the economic policies of other nations may have on its trade and production. But we cannot at the same time, for this reason ignore our duty to examine all facts in their proper perspective and distinguish the essential from the non-essential, what is temporary from the permanent.

Various dangers to the industry.

164. It is with these considerations in our mind that we have examined the present position of this industry. We notice that probably no industry has been assailed by so many dangers at the same time as the Indian silk industry. It has suddenly lost its export

economy of the country, providing a subsidiary occupation and additional resources for a portion of the teeming population which draws its sustenance from the land, and affording opportunities for useful, profitable and congenial employment for some of the educated classes. The industry is also important as supplying the widespread silk weaving industry with much of its raw material. The collapse of the Indian sericultural industry would render the Indian silk weaver entirely dependent on imported raw materials or inferior substitutes. Considering the past history of the industry and its present importance in the agricultural and industrial economy of the country, we are convinced that it should, if possible, be saved from the disaster which threatens to overwhelm it from outside.

Need for reorganisation.

167. As regards internal causes of decline we believe that the most important has been the failure of the industry during the nineteenth and twentieth centuries to keep pace with the tremendous improvements which have been made, alike in Europe and in the Far East, in technical processes and in marketing organisation. And for this failure we believe that Government neglect is in the main responsible. In Chapter II we have shown that in Bengal the production of raw silk, though maintained on the whole in volume, has made no advance in quality since the East India Company gave up its control. And in Kashmir and Mysore such progress as the industry has made has been entirely due to the action taken by the Governments of these States. The history of sericulture in India provides a striking example of the truth of the statement that sericulture has never flourished except when it has had the active assistance of the Government. If our reading of the history of sericulture in India is correct, it would seem to follow that there is little hope of restoring its prosperity unless the Government are prepared to initiate an energetic campaign on its behalf. We indicate in this report some of the more important matters in which the assistance of Government is required, legislation to compel the use of disease-free seed, co-ordination and correlation of the efforts now being made independently by the several interested local and State Governments to improve the condition of the industry, research directed to improve and cheapen the supply of mulberry leaf, to improve the quality and yield of cocoons, and to introduce modern technique in rearing worms and reeling cocoons, and the establishment of conditioning houses and scientific methods of marketing. We recognise that many of these matters have already engaged the attention of provincial and State Governments; but we believe that without a central organisation to co-ordinate their efforts, there is bound to be much waste of energy in duplication and overlapping of work. A central organisation is also needed to study and formulate proposal upon matters which concern more than one province or State or the country as a whole. Unless the Government initiate measures on these lines and prosecute them vigorously, we see no hope that the Indian sericultural industry will ever be able to hold its own against

foreign competitors equipped with all the resources of modern science and backed by varying degrees of Government assistance.

Safeguarding required against unfair competition.

168. If, however, the Government recognise, as we think they should, that sericulture has special claims upon them as a traditional Indian industry and one of great economic value to the country, and accept our recommendation to adopt the measures necessary to improve its condition, we are confident that in a comparatively short period such a material reduction could be effected in its production and marketing costs that it should be able not only to face fair competition in its home markets but also to recover its lost export trade. We have observed that under the present conditions the industry requires safeguarding besides the satisfaction of any claim that it may have for protection. It is difficult to determine how much of the measure of protection which we recommend should be considered as arising from one or other of these somewhat different requirements. But it is clear that the sericultural industry cannot be expected to reduce its costs to the level of the prices resulting from unfair advantages enjoyed by its foreign rivals in the shape of depreciating exchanges and bounties. This is a handicap from which any sound and healthy industry not standing in need of protection may suffer. Therefore in consideration of the fact whether the industry satisfies the third condition or is in a position to 'bridge' in a reasonable period the difference between its fair selling price and the *ex*-duty price *plus* the ordinary revenue duty of the competing import, we shall ignore the advantage conferred on the latter by the two factors of depreciating exchanges and the bounty. Assessing the value of such advantages at roughly Rs. 2 per pound, we shall reduce the margin of difference between the import and home product prices by that amount. We have proposed a duty of Rs. 2-6-0 per pound and we anticipate no difficulty on the part of the industry in bridging this small difference within a very short period. Indeed we not only expect the industry to stand on its own legs given the Government assistance and the adoption of modern improvements on which we have insisted, but we are hopeful that it will revive its old export trade at such prices that it will recover at least the English market. When that happens, the industry will neither require protection, nor will its claim for it be reasonable.

Period of protection need not be long.

169. The industry will need protection against the competition of foreign imports for such period as may be required to enable it to reap the benefit of the reorganisation which we contemplate. We do not consider that this period should be long. We hope that the Government will set up the central organisation as soon as possible. All local and State Governments concerned should realise that under our scheme of protection they are given a strictly limited time within which to put in force the measures necessary for the re-habilitation of the industry; and it should be the duty of the central organisation to see that time is not wasted. We

consider that five years should be a sufficiently long period for the reorganisation to take effect and to result in such a reduction in costs as to render the industry independent of the protective duty. But we recognise that it is impossible for us now to predict with certainty what the effect of the reorganisation will be. Nor can we foresee how long the present depression will last or the unfair competition continue. World economic conditions may change and the measure of protection which we propose may exceed or fall short of actual requirements. And we, therefore, recommend that at the expiry of the period of five years, a further enquiry be held by the Board to ascertain what use has been made of the period of protection and to report whether the industry can dispense with protection or what further measures of assistance it requires. We recommend that the period of protection should be short, first because we wish to lessen as much as possible the burden on the consumer, and secondly, in the interests of the sericultural industry itself, in order that the local and State Governments, knowing that the time is short, may press forward energetically with their measures of reorganisation. Upon the successful completion of these measures will depend the industry's capacity to face competition unsheltered by a protective tariff, and the degree to which it may be held to satisfy the Fiscal Commission's third condition.

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CHAPTER XIII.

The Measure of Protection.

Cost of cocoon production.

170. To ascertain the measure of protection which the industry requires we shall first examine the cost of production of raw silk, then fix a fair selling price for it and finally determine the rate of duty to be recommended as the difference between our fair selling price and the import prices of competing foreign silks. In considering the cost of production we have to study separately the cost of producing the cocoon and the cost of reeling the raw silk; and in the cost of producing cocoons the most important item is the cost of mulberry leaf on which the worm is fed. At the end of Chapter IV we have discussed the cost of cultivating mulberry in different parts of the country and by different methods, and have shown the cost per pound of leaf, and in paragraph 83 we have ascertained the quantity of leaf required to produce a pound of cocoons. Combining these results in the following statement we can estimate the cost of mulberry leaf per pound of cocoons produced.

TABLE LXXIII.

Province or State.	Cost of cultivation. Pies per lb. of leaf.	Pounds of leaf required per lb. of cocoons.	Cost of leaf per lb. of cocoons. A.	P.
Mysore—				
Dry cultivation	2·4	16	3	2
Deep well irrigation	2·7	16	3	7
Shallow irrigation	2·8	16	3	8
Madras	1·5	16⅔	2	1
Bihar and Orissa	·7	25*	1	5
Bengal	1·3	25	2	8
Kashmir	·6†	24	1	2
Jammu	·5†	23	1	2
Punjab	·1†	102	0	10

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* We assume that in Bihar and Orissa leaf is fed on the same scale as in Bengal.

† We have explained in paragraph 60 that it is impossible to give a cost of cultivating mulberry in Kashmir, Jammu and the Punjab; these figures represent the price of mulberry leaf.

Besides mulberry leaf the rearer of silkworms has to provide himself with seed in the form either of seed cocoons or of layings. He also needs appliances such as stands and trays, the cocoonage and knives to cut the mulberry leaf. And he is entitled to look for extra remuneration for the additional labour involved in the combined operations of mulberry growing and silkworm rearing, beyond that which would be involved in raising an ordinary agricultural crop. The Governments of Bengal, Madras and Mysore have sent us statements of the typical cost of raising cocoons on the leaf yielded by a given area of land. These costs as stated in the representations made to us and reduced to terms of pies per pound of cocoons are as follows:—

TABLE LXXIV.

Cost of producing cocoons.

—	Mysore Yield 375 lbs. per acre.		Madras Yield 210 lbs. per acre.		Bengal Yield 260 lbs. per bigha.	
	Per acre.	Per lb.	Per acre.	Per lb.	Per bigha.	Per lb.
	Rs. A.	pies.	Rs. A. P.	Pie	Rs.	pies.
Seed . .	7 14	4·0	1 10 8	1·5	4	3·2
Food . .	83 12	42·9	26 8 0	24·2	40	31·8
Appliances .	5 0	2·6	4 12 0	4·3	12	8·9
Extra labour .	18 12	9·6	41 4 0	37·7	*Nil*	*Nil*
Miscellaneous .	2 13	1·4	1 13 0	1·6	10	7·4
Total .	118 3	60·5	75 15 8	69·3	66	51·3

These costs range from $4\frac{1}{4}$ annas per pound of cocoons in Bengal to $5\frac{3}{4}$ annas in Madras. We have also received a number of statements from private sericulturists in Mysore who give their costs at rates ranging from $4\frac{1}{2}$ to $6\frac{1}{2}$ annas per pound. A zamindar witness from Bengal gives a cost as low as 3 annas per pound. And the Punjab Government have informed us that the only expenses which a rearer in that province incurs are Rs. 2-8 an ounce for the seed and Re. 1 for the mulberry leaf which he requires to raise the 14 to 20 lbs. of cocoons which he expects to get from that seed. This gives a range of prices for the Punjab from 2 annas 10 pies to 4 annas per pound of cocoons.

Variation in costs explained.

171. The variations in the cost of seed are due to the fact that the Madras cost of $1\frac{1}{2}$ pies per pound represents the cost of seed sold at concession rates from the Government grainages. The Mysore cost of 4 pies per pound of cocoons represents the current rate at which disease-free seed is sold at Government or aided grainages; and the Bengal cost of 3·2 pies per pound of cocoons represents the price of seed cocoons bought from a Government nursery where they cost twice as much as those bought outside. The costs shown under food are the costs of cultivating mulberry; we have discussed these variations in Chapter IV. The cost of appliances in Bengal has been pitched unduly high at Rs. 60 for the equipment necessary to produce the full outturn which may be expected from a bigha of land at one crop. With a life of five years this works out to Rs. 3 per crop. The corresponding charge in Mysore works out at Re. 1 per crop. The Madras Government, in addition to providing a sum of Rs. 10 for the extra labour necessary to feed the worms during their fifth age, have also placed a cash value on the labour of the rearer and his household and for this reason their charges under this head are higher than those given by other witnesses. The Bengal miscellaneous charges are in part an addition to the cost of food, since they include the rent of the mulberry land. The costs as stated range from about 3 annas a pound in Bengal to $6\frac{1}{2}$ annas in Mysore. We have made many enquiries in all places which we have visited regarding the prices actually current at the time, and we have examined the course of prices as recorded by such bodies as the Mysore Silk Association. We have come to the conclusion that the present maximum price of cocoons may be taken at about 4 annas a pound in Bengal and $4\frac{1}{2}$ annas or less in Madras and Mysore; the univoltine cocoon of the Punjab is also quoted at about $4\frac{1}{2}$ annas a pound.

Cost of cocoon production in Kashmir.

172. It is interesting to compare with the figures given above the expenditure incurred by the Kashmir State on the production of cocoons. The expenditure consists of the cost of seed, both imported and local, expenditure on mulberry nurseries and plantation and the payments made to the rearers, which correspond to the expenditure in other provinces on appliances, labour for picking leaves and miscellaneous. There is little direct expenditure on the

cultivation of the mulberry leaf. The miscellaneous charges represent the cost of establishment and other overheads:—

TABLE LXXV.

—	Expenditure on production of cocoons per pound.	
	Kashmir pies.	Jammu pies.
Seed	5·9	5·3
Mulberry plantation	5·0	3·0
Paid to rearers	44·8	47·9
Miscellaneous	11·9	11·0
TOTAL	67·6	67·2

Comparison of these figures with those relating to other parts of India suggests that both on overheads and on labour the Kashmir Government is paying on an unduly high scale.

Fair price for cocoons.

173. In deciding upon the cocoon price upon which to base our recommendations we have been influenced by various considerations. We have made no attempt to restore the price of cocoons to the level which prevailed in the years immediately preceding the great depression, much less in the boom year of 1922. We cannot anticipate the effects of the World Economic Conference in raising commodity prices, and the only safe course for us is to assume that the present prices have come to stay and that if they are raised at all above the existing level by inflation, depreciation and other artificial devices which seem to find favour in America, they will be raised only to a limited extent. The efficacy of these measures in raising world prices will largely depend upon the co-operation of such important consuming and producing Oriental countries as China, Japan and India and we are not sure that the co-operation needed will be forthcoming. It will, therefore, be wiser and safer for depressed industries to adjust their cost of production to the present or only a slightly higher level of prices rather than wait for the boom prices of a golden age which may never return. This argument of ours applies with special force to silk which has on the whole an elastic demand and can be easily replaced by cheap substitutes. We are further desirous that the industry should regain its lost export market as soon as possible; and with this end in view, we are more anxious to improve its competitive power than to protect it against outside attacks. For this purpose it must bring down its costs to the level determined by fair competition from Japan and China. At the same time we do not wish to fix the price of cocoons so low as to deprive the grower, who is also the rearer, of all incentive to cultivate mulberry in preference to alternative crops or improve the quality of his product by adopting the improvements we have stressed in previous chapters. On full consideration of all the relevant facts we have decided to base our

recommendations on a cocoon price of 5 annas a pound. This is rather above the level of present prices. But we recognise that if sericulture is to develop the rearer must be assured of a price for his cocoons sufficient to remunerate him for his labour and comparable with the return he might expect to receive if he cultivated his land with a crop other than mulberry. The Mysore Government have based the whole of their case for protection on a cocoon price of 5 annas a pound from which it is not unreasonable to infer that they consider that at this price the return will be adequate. Nor do we regard the price as unnecessarily high. We have noticed that at the present low level of prices both in Mysore and in Bengal there has been a fall in the acreage of land under mulberry; and this tendency can be checked only by raising the price of cocoons. Moreover we wish to fix the price of cocoons high enough to encourage the rearer to devote more attention to his worms, so that by sufficient and suitable feeding and by careful treatment in other ways the quality of the races may be so improved that a better class of cocoons may be obtained. We believe that a price of 5 annas a pound is high enough to do this, while it is not so high as to encourage extravagant hopes of a return of the boom prices. We have decided to adopt a uniform price for the whole country. We have done so in spite of the fact that the Bengal cost of production and the prices prevailing there are materially lower than those elsewhere, because the advantage we allow to Bengal in this respect is neutralised by the lower average rendita we assume later for the whole of India. Moreover, we believe that Bengal needs a greater incentive for improving the quality of its cocoons. We have not considered Kashmir in this matter on account of the peculiarity of its monopolistic organisation. An examination of the fair selling price of an agricultural product really resolve itself in the conditions of homestead farming prevailing throughout India into an enquiry into a fair agricultural wage for the labour which the peasant and his family put in on their own farm. The statements of costs furnished to us by the Mysore, Madras and Bengal Governments, therefore, represent rather what the rearer considers a fair return for his work and trouble than an exact statement of expenditure. We have seen in Chapter IV that in regard to mulberry cultivation, which constitutes one of the principal items in the cost of cocoon production, it is impossible to arrive at any estimate of cost which is more than approximate. It is the cocoon which is the marketable product of the combined operations of mulberry cultivation and silkworm rearing. When the price of cocoons falls below the figure given as the cost of producing them, the effect upon the rearer is not that he suffers a cash loss, for his outlay has been in the main his own labour and that of his household, but that he gets a lower rate of remuneration for his own work on his own farm. The answer to the question whether this return on a price of five annas for cocoons is fair depends on a number of considerations related to the agriculturist's living cost, his standard of living, its adequacy for efficiency, etc., which we could not investigate without protracting our enquiry. We are, however, satisfied that as compared with European standards or even with

Japanese or Chinese standards it is low, but we are also satisfied that it is not low when compared to the returns obtained from other crops. We have seen in Chapter VI that the price of cocoons has not fallen more than that of other possible alternative crops in the last six years. We do not think we should be justified in maintaining at the expense of the taxpayer and the consumer the returns from some agricultural operations at a level relatively higher than the level of those obtained from others of equal difficulty, though we may be convinced that these returns measured in absolute standards of living are extremely inadequate.

Cost of reeling: 1. Charkha.

174. Having settled on a fair price for cocoons we next proceed to examine the cost of reeling. We have seen that in all parts of India except in Kashmir the great bulk of the reeling is done on hand-driven charkhas. It is always difficult to obtain accurate costs of a cottage industry; the cottager keeps no regular accounts: and much of the work he does himself or through members of his family. Silk reeling is typical of cottage industries in this respect. Since, however, the cost of cocoons represents as much as 80 per cent. of the cost of reeling by hand, it will be clear that the main factors influencing the cost of the operation are the price paid for cocoons and the rendita or quantity of cocoons used to produce a given quantity of silk. The statements of cost which the Madras and Mysore Governments have sent us are based on cocoon prices of 5¾ and 5 annas a pound. Of the two statements which we have received from Bengal, one has a cocoon price of 4 and the other 4½ annas while the Punjab price too is 4½ annas. Bengal gives us one rendita of 16 and one of 13; Madras and Mysore work on an average rendita of 14, and the Punjab univoltine cocoon is said to give a rendita of 10½. The other items of expenditure are fuel, water, labour, commission or brokerage on the purchase of cocoons and the sale of silk, transport and contingencies or miscellaneous charges. The charges claimed for fuel vary between three annas a pound of silk in the Punjab and six annas eight pies in Mysore, and charges for water between one anna in Bengal and two annas eight pies in Mysore, while Madras claims only five annas for fuel and water together. The labour required is a reeler and a turner for each charkha. The rates of wages reported from various parts of the country are as follows:—

TABLE LXXVI.

Rates of Wages.

——	Punjab.	Bengal.	Bengal.	Madras.	Mysore.
Wages paid to reeler.	12 annas a day.	6 annas to 8 annas a day.	Rs. 12 a month.	7½ annas a day.	9 annas a day.
Wages paid to turner.			Rs. 6 a month.	1½ anna a day.	5 annas a day.

For commission and transport Madras claims an anna and a half per pound of silk, Bengal four annas, and Mysore five and a half annas. These costs are set out in the Table below:—

TABLE LXXVII.

Cost of reeling 1 lb. of raw silk on a charkha working 9 hours a day for 15 days in a month: daily output 1½ lbs.

——	Punjab.	Bengal.		Madras.	Mysore.
Rendita	10½	16	13	14	14
Price of cocoons: annas per pound.	4½	4	4½	5¾	5
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
Cocoons	2 15 3	4 0 0	3 10 6	5 0 6	4 6 0
Fuel and water . . .	0 5 0	0 5 0	0 5 0	0 5 0	0 9 4
Labour	0 12 0	0 10 0	0 7 8	0 6 6	0 9 4
Supervision . . .	..	0 2 0	..	..	..
Repairs	..	0 0 6	..	0 0 6	..
Commission etc., selling expenses.	..	0 4 0	..	0 1 6	0 1 6
Miscellaneous . . .	0 2 0	0 1 0	..	..	0 7 4
Total .	4 2 3	5 6 6	4 7 2	5 14 0	6 1 6
Deduct value of waste (⅜ lb).	..	..	0 4 6*	0 2 0	0 1 6
Nett works cost . . .	4 2 3	5 6 6	4 2 8	5 12 0	6 0 0
Reeling charges (above cost of cocoons) per pound of silk.	1 3 0	1 6 6	0 12 8	0 13 6	1 10 6

Works cost of charkha reeling estimated.

175. We have received evidence in all parts of the country that the charkha reeled silk is of three or four distinct qualities which are marked by distinct differences of price with a gap which may be as wide as Rs. 2 between the highest and the lowest qualities. We have, therefore, decided that it would be more in accordance with the actual practice of the industry to set out the cost of producing three qualities of silk. The quality of the silk is affected by various matters in the process of reeling. First there may be selection of cocoons; for the manufacture of silk of the better qualities specially good cocoons are sometimes picked and a higher price may be paid for them. We have, however, explained in paragraph 173 why we have decided to treat the price of cocoons as uniform throughout the country. Next there may be a wide variation in rendita; we have heard of a rendita of 16 in Bengal

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* Value of 1½ lbs.

while from reelers in Mysore a rendita as low as 12 has been reported. Generally the Bengal rendita is higher on account of the inferiority of its cocoons. The lower rendita in Kashmir and Punjab are similarly due to the superiority of their univoltine cocoons. Given the same class of cocoons the higher the rendita the better the silk and the more the waste. For a low rendita means that much of the waste and gum is left in the silk which is thus rendered coarse and impure. For our three qualities we adopt rendita of 15, 13 and 12. The next factor which may influence the quality of the silk is the skill of the labour; we recognise this by making a difference of an anna a day between the wages paid for each quality. Other matters in which the difference of quality is reflected in the difference of price are the charges for transport and brokerage of cocoons and for supervision and management. We have not thought it necessary to frame different tables of costs for each province or State. We think that the following Table represents the state of things alike in Bengal and in Mysore; and the costs in the Punjab are lower, so that any measure of protection which is sufficient for Bengal will be more than adequate for the Punjab. Our Table of costs is as follows:—

TABLE LXXVIII.

Cost of production of 1½ lbs. of raw silk by charkha working 9 hours a day for 15 days in a month.

Quality.	1st.			2nd.			3rd.		
Rendita	15			13			12		
	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.
Cost of cocoons at 5 annas a pound	7	0	6	6	1	6	5	9	0
Cost of labour (daily wages: 8 annas for the reeler for 1st quality, 7 annas for 2nd and 3rd quality, and 4 annas for the turner for 1st and 2nd quality and 3 annas for 3rd quality) .	0	12	0	0	11	0	0	10	0
Cost of fuel	0	4	0	0	4	0	0	4	0
Cost of water (including wage of waterman) .	0	2	0	0	2	0	0	2	0
Selling expenses (commission to raw silk merchants)	0	2	3	0	2	3	0	2	3
Transport of cocoons and brokerage	0	3	0	0	2	9	0	2	6
Contingencies (transport charges of silk, cost of oil, thread, skein making, steaming of cocoons, etc.)	0	1	6	0	1	6	0	1	6
Supervision and management	0	1	3	0	1	0	0	0	9
Total cost of 1½ lbs. .	8	10	6	7	10	0	7	0	0
Cost of 1 lb. =	5	12	4	5	1	4	4	10	8

Overhead charges.

176. To these works costs an addition must be made on account of overheads in order to arrive at a fair selling price. We recognise that a reeler probably needs working capital to the extent of about three months expenditure, and we allow for interest on this amount at 12 per cent., which we believe is the lowest rate at which a cottage worker like a charkha reeler is likely to be able to borrow. We allow depreciation on the charkha which costs Rs. 15 and should last for five years. And we allow profit at two annas a pound. From the final figure thus obtained we make a deduction on account of the sale value of the waste obtained in the process of reeling. And finally in the case of the first quality silk, which alone competes with foreign re-reeled silks, we make an addition at the rate of three annas a pound which represents part of the cost of re-reeling. We have explained in Chapter VIII that the average cost of the re-reeling operation is 9 annas a pound and in Chapter XI that the difference in quality between Indian and imported silks may be valued on the average at 6 annas a pound. We have, therefore, allowed three annas a pound—the difference between these amounts—as the cost of re-reeling first quality silk. The rest of the cost we take to be represented by the increased value which the silk acquires as a result of the re-reeling process. Our fair selling prices arrived at by these means are shown in the Table below:—

TABLE LXXIX.

Fair selling prices for charkha reeled silk.

Quality.	1st.	2nd	3rd.
	Rs. A. P.	Rs. A. P.	Rs. A. P.
Works cost of one pound .	5 12 4	5 1 4	4 10 8
Interest on working capital (12 per cent. per annum —3 months output) .	0 2 5	0 2 2	0 2 0
Depreciation (at Rs. 3 a year: cost of charkha Rs. 15: life five years) .	0 0 3	0 0 3	0 0 3
Profit	0 2 0	0 2 0	0 2 0
Total	6 1 0	5 5 9	4 14 11
Deduct cost of ¾ lbs. waste	0 1 6	0 1 6	0 1 6
	5 15 6	5 4 3	4 13 5
Add re-reeling charges .	0 3 0	......	......
Fair Selling **Price** per pound	6 2 6	5 4 3	4 13 5

Reeling costs. (2) Filatures.

177. We next proceed to examine the costs of producing the silk in filatures; in doing so we confine our attention to the Kashmir and Jammu filatures and those of the silk filatures at Bangalore and Kollegal. We omit from our reckoning the costs of the Mysore Government filature which as we have observed in paragraph 92, is a demonstration and instructional rather than a commercial concern.

Proportion of reeling cost to cost of cocoons.

178. As in reeling by hand, so also in the case of filatures the value of the cocoons represents the bulk of the works expenditure. But whereas the value of the cocoons represents about 80 per cent. of the cost of hand reeled silk, and the proportion is about the same in the Bangalore filature, in Kashmir and Jammu the value of the cocoons represents less than 70 per cent. of the cost of the silk:—

TABLE LXXX.

Works expenditure in filature.

	Kashmir, 1931-32.		Jammu, 1931-32.		Kollegal, 1931-32.		Bangalore, 1932-33.	
	Rs.	Per cent.	Rs.	Per cent.	Rs.	Per cent.	Rs.	Per cent.
Cost of cocoons	8,78,335	68	1,51,652	69	18,804	73	16,585	80
Cost above cocoons . .	4,18,138	32	66,777	31	6,828	27	4,235	20
Total .	12,96,473	..	2,18,4 9	..	25,632	..	20,820	..

To some extent these figures indicate the superiority of the Kashmir univoltine cocoon. In Kashmir twelve pounds of green cocoons will produce a pound of silk; in Jammu about thirteen and a half pounds of cocoons are required; the difference between Kashmir and Jammu is due partly to the fact that Jammu consumes a larger proportion of white cocoons which yield less silk than the yellow ones which are more extensively used in Kashmir, and partly to the fact that the machinery in the Jammu filature is of an older type than that in the new Kashmir filatures. In the Bangalore filature the rendita is 15½ while it is 17½ to 18½ in Kollegal.

Analysis of filature costs.

179. We next set out below the works expenditure in producing a pound of raw silk as given by each filature for the year 1931-32; the filature in Bangalore was not working that year and we give the costs for the

Kollegal filature which is under the same ownership:—

TABLE LXXXI.

Works cost of producing one pound of raw silk in filatures.

	Kashmir.			Jammu.			Kollegal.		
Rendita— lbs. green cocoons to 1 lb. silk	12¼			13½			17·6		
Price per pound of cocoons	5¾ annas			5⅓ annas			5⅔ annas		
	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.
Cost of cocoons	4	6	10	4	12	0	6	3	4
Labour	1	2	11	1	5	6	0	10	7
Power, light an fuel	0	5	1	0	1	9	0	5	6
Supervision	0	5	6	0	8	1	1	1	7
Repairs	......			......			0	1	7
Other charges	0	4	2	0	3	3	0	0	9
Total	6	8	6	6	14	7	8	7	4
Total reeling charges above cost of cocoons	2	1	8	2	2	7	2	4	0
Percentage of cost of cocoons to total cost	67·8			68·7			73·4		

These are average costs for all classes of silk. In Kashmir and Jammu the range of qualities is considerable and it would have been useful if we could have obtained the actual cost of producing each quality. But cost accounting has not been adopted in these State factories, whose accounts indeed are maintained partly by the Accountant General and partly by departmental officials. We have therefore had to rely entirely upon these average figures. The grading of the Kashmir silk is regulated mainly by the selection of cocoons and the machinery employed in reeling them. And since one price is paid for cocoons irrespective of quality, there is probably less variation in Kashmir than elsewhere in the cost of manufacturing different qualities of silk. None of these costs represent economical working; for none of the filatures worked to full capacity in 1931-32. The high costs in Kollegal represent partly the inferiority of the Kollegal multivoltine cocoon to the Kashmir and Jammu univoltine, partly excessive charges for supervision and partly the fact that the outturn was only 3,027 pounds of silk against a capacity of about 15,000 pounds. The cost of labour in Kashmir and Jammu is as we have already noticed unduly high compared with other parts of India.

Estimated cost in economical filatures.

180. Since these costs are not economic we obtained a number of estimates of the cost of working a filature of economical size to full capacity. We have given our reasons in Chapter VII for considering that on the whole a 200 basin filature is likely to give

the best results in most parts of India. For the sake of comparison we show below the costs of a filature of this size as stated by the Kashmir and Mysore Governments, together with the cost of working an 100 basin filature as given by the Bangalore filature and the cost of working a 40 basin filature as given by the Director of Industries, Madras.

TABLE LXXXII.

Estimated cost of producing one pound raw silk in filatures.

	Kashmir.	Mysore.	Bangalore.	Madras.
Number of Basins	200	200	100	40
Rendita—Green cocoons per pound silk	12	18	16	17
Cost of cocoons per pound	5¼ annas	5¼ annas	6 annas	5¾ annas
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
Cocoons (including cost of transport and stifling)	3 14 10	6 3 4	6 0 0	6 1 9
Fuel and Power	0 3 11	0 6 3	0 1 8	0 2 2
Labour	1 0 11	0 13 0	0 11 10	0 10 1
Supervision	0 3 2	0 3 1	0 5 10	0 5 1
Repairs	0 0 5	0 0 2	0 0 3	0 0 3
Other charges	0 3 1	0 1 0	0 1 10	......
Total	5 10 4	7 10 10	7 5 5	7 3 4
Deduct value of Waste	0 8 6	0 5 7	0 4 10	0 4 9
Nett Cost	5 1 10	7 5 3	7 0 7	6 14 7
Depreciation	0 2 2*	0 1 3	0 2 3	0 0 7
Interest on working Capital	0 2 0*	0 3 0	0 4 8	0 3 1
Profit	0 4 9*	0 2 6*	0 2 2*	
Fair selling price	5 10 9	7 12 0	7 9 8	7 2 3

Estimated cost in model filature of economical size.

181. There are two main reasons for the great difference between the Kashmir and Mysore estimates for filatures of the same size—first the superiority of the Kashmir cocoon and secondly the fact that the Kashmir production is estimated at 90,000 pounds of silk in the year as against only 75,000 pounds in Mysore. We consider that the cost of cocoons (including charges for transport and stifling) should nowhere exceed 5½ annas and that the provision for labour in Kashmir should be reduced. We consider that the following would be a reasonable estimate for the

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* Details not having been furnished in these cases, we have framed estimates allowing depreciation at the usual rates of 2½ per cent. on buildings and 7½ per cent. on machinery, interest on working capital at 7½ per cent. and profit at 8 per cent.

working of a 200 basin filature using the Mysore multivoltine cocoons:—

TABLE LXXXIII.

Estimate of the Cost of Working a 200 Basin Filature.

		Rs.	A.
1. Total quantity of cocoons—Rendita 16 (Mysore). Production 1·5 lbs. per basin 1·5×200×16×300 days = 1,440,000 lbs. at 5 annas per lb. Quantity of silk produced 90,000 lbs.		4,50,000	0
2. Transport charges at 4 pies per lb. for 1,440,000 lbs.		20,000	0
3. Stifling charges at 2 pies per lb. for 1,440,000 lbs.		15,000	0
4. Cost of labour with one cooker for 2 basins		44,868	0
5. Cost of supervision and management .		23,712	0
6. Cost of power for 27,000 units at 9 pies per unit		1,265	10
7. Cost of light at Rs. 10 per month . .		120	0
8. Cost of fuel—7½ tons per day at Rs. 8 per ton—7·5 × 8 × 300 = ...		18,000	0
9. Cost of water 334,000 gallons at Re. 1 per 1,000 gallons—334 × 12		4,008	0
10. Cost of repairs, renewals, etc., at 1 per cent. on the value of machinery, Rs. 69,500		695	0
11. Miscellaneous at 3 pies per lb.—90,000 × 3 pies		1,406	4
12. Selling expenses including stationery, etc., at 6 pies per lb. 90,000 × 6 = . .		2,812	8
		5,91,887	6
Deduct value of waste—quantity of waste at ·7 lb. per lb. of silk (or 7·0 per cent., *i.e.*, $\frac{9,000 \times 7}{10}$ = 63,000 lbs. at 7 annas . .		27,562	8
Total works expenditure		5,64,324	14
Overheads—			
(*a*) Depreciation—	Rs.		
Buildings—2 per cent. on Rs. 52,000 . . .	1,040		
Plant and machinery—5 per cent. on Rs. 37,000 .	1,850		
Tools and scientific appliances—10 per cent. on Rs. 6,000 . . .	600		
Motor Vans—20 per cent. on Rs. 10,500 . . .	2,100		
		5,590	0
(*b*) Interest on capital expenditure of Rs. 1,09,500 at 8 per cent. . .		8,760	0
(*c*) Interest on working capital at 9 per cent. for 3 months output of cocoons (360,000 lbs.) and silk (22,500 lbs.) .		23,288	0
Total cost of production		6,01,962	14

On this data we arrive at the following cost per pound of raw silk reeled:—

TABLE LXXXIV

Cost of producing 1 lb. of raw silk in a 200 Basin Filature.

Rendita— lbs. green cocoons to 1 lb. silk	16
Price of cocoons per lb.	5 annas

	Rs.	A.	P.
Cost of cocoons (including transport at 4 pies and stifling at 2 pies per lb.)	5	8	0
Fuel an power	0	3	10
Labour	0	8	0
Supervision	0	4	3
Other charges	0	0	10
Total cost	6	8	11
Deduct value of Waste	0	4	11
Nett cost	6	4	0
Depreciation	0	1	0
Interest on working capital	0	4	2
Profit	0	1	7
Fair selling price	6	10	9

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The only items in this statement on which it is necessary to comment are the overhead charges. We have allowed for depreciation at the rates of 2 per cent. on buildings, 5 per cent. on plant and machinery, 10 per cent. on tools and scientific apparatus and 20 per cent. on motor vans which are different from those we have allowed in the past for other industries but which we consider to be appropriate for this industry. We have allowed for profit at the usual rate of 8 per cent. on the fixed capital actually required for a plant of this capacity (not as has been claimed by Kashmir upon the State's whole investment in the industry from its inception) and in the case of interest on working capital we have allowed 9 per cent. instead of our usual rate of 7½ per cent. since we understand that it is rarely if ever possible for industrial enterprises in localities outside the great port towns and industrial centres to borrow below this rate. We accept the general opinion that not more than three months' works expenditure is needed as working capital. The final result gives us a fair selling price for filature silk of Rs. 6-10-9 as compared with the prices of Rs. 6-2-6 Rs. 5-4-3 and Rs. 4-13-5 for charkha silks.

Comparison of competing classes of silks.

182. We have explained in Chapter X the method by which we believe that the most accurate picture of the competition between Indian and imported silk can be presented and we have summarised our conclusions as follows:—

TABLE LXXXV.

I. Chinese and Japanese filature silk	Competes with	I. Indian filature silk.
II. Chinese filature silk III. Chinese re-reeled silk. . . .	„	I. Indian filature silk, and II. Bengal and Mysore 1st quality charkha silk.
IV. Native reel silk including Japanese and Shanghai filature dupions.	„	III. 2nd and 3rd quality Bengal and Mysore charkha silk.
V. Chinese waste products and ordinary dupion silk.	Does not compete directly, but may compete indirectly as cheaper substitute like spun or artificial silk for real silk owing to reduced purchasing power.	

We propose to base our estimate of the measure of protection which the industry requires on (1) a comparison of the prices of imported filature and re-reeled silks with those of first quality Indian charkha silks, and (2) a comparison of the prices of native reel silks and filature dupions with those of second and third quality Indian charkha silks. We propose to arrive at a measure of protection by comparing the prices of foreign silks with the different charkha silks with which they compete, since 95 per cent. of the Indian production is charkha silk. We shall then compare the average price of foreign filature silk with the fair selling price of Indian filature silk, though the competition between them, due to a marked difference of quality, is indirect, and proceed to determine whether protection sufficient for charkha silk is also adequate for filature silk. On the imports side we leave out of account the Japanese filature silk which as we have seen does not compete with Indian charkha silk; we also leave out of account the Chinese waste products and inferior dupions which are markedly inferior in quality to any Indian charkha silk and compete only indirectly as cheap and inferior substitutes. Our task is therefore narrowed to that of comparing the *ex*-duty prices of filature, re-reeled, and native hand-reeled silks which are given in Chapter XI, with the fair selling prices of 1st, 2nd and 3rd quality Indian charkha silks which we have just worked out. Since the 1st quality Indian silk has to meet competition both from filature and from re-reeled imported silks we shall take the average price of silk of these two classes for our comparison; and since the dupion and native hand-reeled silks compete with the 2nd and 3rd quality Indian charkha silk, we shall compare the average price of the imports of that class with the average fair selling price of the 2nd and 3rd quality Indian silks.

Price of imported silks.

183. The prices of the imported silks so grouped into two classes are as follows:—

TABLE LXXXVI.

Prices of the Imported Silks which compete with Indian Charkha Silks.

	Price *ex*-duty per lb. Rs. A. P.
Filature and Re-reeled Silks—	
Canton Steam Filature	3 11 0
Minchow filature superior	4 8 0
Minchow filature common	3 8 0
Tsatlee re-reeled	3 10 0
Kubin re-reeled	4 0 0
Minchow re-reeled	3 8 0
Minyeang	3 7 0
Average	3 12 0
Native Re-reeled and Dupion Silks—	
Minchow long reel	2 8 0
Kubin native	2 6 0
Tsingchow	2 10 0
Li Minyang	1 15 0
Hoyung	2 10 0
Kath	3 7 0
Finchow White	2 9 0
Kakadia	2 12 0
Dupion filature, White or Yellow	2 13 0
Kahing	3 3 0
Canton long reel or Saisee	2 7 0
Japanese Dupion	2 11 6
Average	2 10 7

We have explained in paragraph 147 why we omit Minyeang Inferior Re-reeled from the first class and why Shanghai filature Dupion is included in the second class. Another particular in which this Table differs from that in paragraph 148 is that for the purpose of estimating the average price of competing silks we take account of Japanese Dupion as well as of Chinese silks. Thus the price to be compared with the fair selling price of 1st quality charkha silk will be Rs. 3-12-0 and the price to be compared with the fair selling price of 2nd and 3rd quality charkha silks will be Rs. 2-10-7. We have seen in paragraph 149 that foreign silk enjoys no special advantage and suffers from no special disability on account of selling or freight charges. Our fair selling prices include selling charges and so do the Bombay *ex*-duty prices of imported silks upon which we have based our calculation. Freight charges being roughly equal we have omitted from both sides of the account.

Measure of protection required.

184. We have seen in paragraph 176 that the fair selling prices of Indian charkha silks may be taken at:—

	Rs.	A.	P.
1st quality	6	2	6
2nd quality	5	4	3
3rd quality	4	13	5

The difference between the price of the 1st quality (Rs. 6-2-6) and the average price of imported filature and re-reeled silks (Rs. 3-12-0) is Rs. 2-6-6; and the difference between the average of the prices of the 2nd and 3rd quality Indian silks $\frac{\text{(Rs. 5-4-3 plus Rs. 4-13-5}}{2}$ = Rs. 5-0-10) and the price of imported Native Reeled silks (Rs. 2-10-7) is Rs. 2-6-3. The measure of the protection needed by Indian charkha silk may be taken as Rs. 2-6-0 a pound. We recommend accordingly that protection should be given in the form of a specific duty of this amount.

Filature silk adequately protected.

185. We have seen that a reasonable fair selling price for Indian filature silk is Rs. 6-10-9 a pound. The average price of foreign filature silk is Rs. 4-3-6 as shown below:—

TABLE LXXXVII.

Prices of imported filature silk.

	Ex-duty price per lb. Rs.	A.	P.
Japanese filature silk	5	3	0
Minchow filature superior	4	8	0
Minchow filature common	3	8	0
Canton steam filature	3	11	0
Average	4	3	6

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The duty which we recommend will cover all but an anna of this difference and will afford adequate protection for the Indian filatures.

Nature of assistance recommended.

186. We have considered the possible alternative method of protection by means of a bounty; but we have decided that this would not be appropriate to the conditions of the Indian industry the bulk of which is carried on under cottage conditions. We foresee great administrative difficulties in administering any form of bounty either on the production of cocoons or on the reeling of raw silk. A system of bounties is suitable only for an industry which is to some extent at any rate concentrated in factories, not for one like the sericultural industry of India which as it exists to-day is dispersed in many villages in each of the areas where it

is practised. We have also considered the suggestion that assistance should be given in the form of a bounty on the export of silk waste. We do not support this recommendation; for as we have indicated in previous chapters so far from wishing to encourage the export of silk waste we are anxious to see mills established in India to convert it into spun silk. We have therefore recommended that assistance should be given in the form of a specific duty. At the same time we recommend that the alternative rate of *ad valorem* duty be raised from 25 to 50 per cent. This proposal is based upon three considerations: first, we wish to maintain a balance between the specific and the *ad valorem* rates of duty; secondly, we wish to protect the revenue from loss in case the general level of prices should rise during the period of protection; and thirdly, we wish to give the Indian filatures this measure of assistance against the risk of an increase in the imports of high quality silk. An increase in the *ad valorem* rate of duty alone would either fail to give adequate protection against the cheaper qualities of imports or give more protection than is needed in the case of the more expensive qualities. It would either be ineffective or unduly burdensome to the consumer. But we recognise that unless the *ad valorem* rate of duty is raised along with the imposition of a specific duty, the revenue may suffer especially if prices recover from their present low levels and the Indian filatures may have to face the competition of increasing imports of high quality silks.

Measure of protection adequate.

187. We recognise that the measure of assistance which we recommend falls short of the amount required to restore to the industry the conditions which it enjoyed up to 1929. In so far as the decline of the industry is due to contraction of the market for silks, consequent upon the fall in purchasing power caused by the economic situation all over the world, we regard the decline as permanent and expect the industry to meet it by an adjustment of the costs of production, as in fact it has done. It is only in so far as the present crisis in the industry has been caused by such special matters as the bounty given by the Chinese Government to encourage the export of raw silk, and the exceptional increase of cheap imports encouraged by the fall in the value of the Chinese and Japanese currencies that we consider that the industry is entitled to claim the temporary shelter of a protective tariff. We are informed that the bounty given to exports of Chinese silk amounts to 100 taels per bale of 132·3 pounds, or at the present rate of exchange approximately Re. 1 per pound. Between January 1929 and December 1932 the fall in the Chinese and Japanese exchanges was between 33 and 35 per cent. which is equivalent to Rs. 1-8-0 in the case of a silk which is now worth Rs. 3. It would thus appear that a duty of Rs. 2-6-0 a pound is no more than sufficient to balance the effects of the bounty and the depreciation of currency. From this point of view the amount of duty which we recommend is certainly not excessive. It will not operate as a heavy burden on the consumer since the price of first class charkha silk will still remain much below the 1929 level of Rs. 8-2-0 per lb. As long as the present

depression lasts, it cannot rise much above the present level as internal competition between the charkha and the filature and amongst the charkhas themselves is extremely keen. Any tendency for prices to rise beyond a certain competitive level will be further checked by the elastic nature of the demand and the fear of cheap substitutes. While the duty is not excessive we are convinced by our comparison of the cost of production with import prices that it is sufficient to meet the needs of the industry.

Effect of our proposals on revenue.

188. We anticipate a decided fall in the imports of raw silk as a result of our proposals. The specific duty which we recommend involves at the present price of raw silk an increase of duty from 25 to about 80 per cent. So that there will be no loss of revenue until the volume of imports falls by somewhere near 70 per cent. We do not anticipate a sudden fall in imports to this extent. We have also made provision for an increase in the alternative *ad valorem* rate of duty which will benefit the revenue if prices rise. We do not therefore consider that our proposals constitute a menace to the revenue of the country.

Period of protection.

189. We recommend that the duty be in force for a period of five years. In our discussion of the Fiscal Commission's third condition we have elaborated our reasons for not recommending a longer period of protection. The object with which we propose the duty is to afford the industry time in which to reorganise itself, to reduce its cost of production by cheapening mulberry leaf, eliminating loss in cocoon production, and improving the efficiency of its reeling methods, and to introduce some degree of method and system into its marketing. We consider that if vigorous action is concerted by the local and State Governments concerned, and if the Imperial Council of Agricultural Research initiates effective measures of co-ordination and research, much should be accomplished in five years. We contemplate a further enquiry at the end of this period to take stock of the situation and make recommendations for the future. We refrain from recommending protection for a longer period, partly because until the industry is reorganised we can have no adequate data on which to base future costs of production, and partly because in the constantly changing world conditions of to-day, we find it impossible to foresee what developments in exchanges, demand, prices and returns from alternative crops may occur during the next few years. We hope that by the time the further enquiry is held conditions may have become sufficiently settled to justify more confident forecasts than we are now in a position to make.

Increase of duty applicable to all classes of silk.

190. We recommend that the duty be applied to all classes and qualities of raw silk. This recommendation may appear to be inconsistent with our finding that what we have called the waste products and ordinary dupions do not really enter into direct competition with Indian raw silk. We hold however that in the present

state of the industry protection is needed against indirect, just as much as against direct, competition. We also foresee that administrative difficulties may make it difficult to differentiate for the purposes of duty between one class of raw silk and another, and that attempts may be made to frustrate the object of protection by passing off superior silk as inferior. For this reason we recommend that all classes of raw silk be made liable to the higher rates of duty.

Increased duty recommended on cocoons.

191. We further recommend that, in order to guard against the risk that silk producing countries may attempt to nullify these protective measures by sending silk to India in the form of cocoons, the same rate of *ad valorem* duty be applied also to cocoons.

Need for emergency action.

192. We have seen in the preceding chapter that the sericultural industry needs more safeguarding than protection. Indeed the whole of the specific duty of Rs. 2-6-0 per pound we propose may in a certain sense be regarded as a safeguarding duty necessitated by the depreciation of the Chinese and Japanese exchanges and the bounty paid on Chinese silk exports. These facts bring the sericultural industry within the class of industries contemplated by the recently enacted Indian Safeguarding of Industries Act. If the Government of India are satisfied about the correctness of our facts and the interpretation we have put on them, we recommend they should lose no time in carrying out as an emergency measure our proposal about the enhancement of the duty on raw silk by executive action under the provisions of that Act. The precise formulation of proposals into a comprehensive scheme of protection on the lines we have suggested will necessarily require time. Their sanction by the Indian legislature can not be forthcoming earlier than next autumn. We fear that in the meanwhile under the combined stimulus of unfair competition and fear of protection, the imports of silk may increase to such an extent that unless quick action is taken on the lines we suggest, the industry may be overwhelmed by a grave and irremediable disaster.

CHAPTER XIV.

Supplementary Proposals.

Need for compensating the weaver for the increased cost of his raw material.

193. Under our terms of reference we are asked to examine the effect on the weaving industry of the duty which we recommend for the protection of raw silk. We have already seen in the chapter on handloom weaving that there is grave danger of an injury to the silk weaving industry if the price of its raw material is raised beyond the present level. Applicants for protection as well as those opposed to protection have therefore urged with equal emphasis that the weaving industry should be given protection corresponding to the increase which may result in the cost of its raw material by any proposals which we make. In order therefore to determine the additional burden imposed on the weaver, we have ascertained the proportion which the cost of the raw material bears to his total cost of production.

Increase of duty recommended on silk goods.

194. From an examination of the statements compiled in all provinces and summarised in Appendix C, we come to the conclusion that the cost of raw silk is generally 50 per cent. of the total value of a silk cloth piece. Assuming by way of example that the total cost of a piece is Rs. 100, Rs. 50 represents the cost of the raw silk. The *ex*-duty value of this material is Rs. 40. We are proposing a specific duty of Rs. 2-6-0 per pound which is roughly equivalent to an *ad valorem* duty of 80 per cent. on the present average *ex*-duty value of all raw silk imports, namely Rs. 3 per pound. The value of the silk in the piece is therefore put up by the new scale of duty to Rs. 72 and of the whole piece to Rs. 122, that is by 22 per cent. In order to work out the corresponding increase in the duty on silk goods, we must increase the price of the competing imported piece to the same level as that of the Indian made piece. Assuming the normal price of the imported piece to be Rs. 150, its present *ex*-duty value is Rs. 100: under our proposals it is necessary to raise the price of this piece by 22 per cent., *i.e.*, to Rs. 183. This gives us a duty of 83 per cent. on imported silk goods, instead of the present rate of 50 per cent., which we recommend. We consider that this measure is justified by the present state of the silk hand weaving industry and sufficient to attain the object of the local governments who are all concerned to prevent any injury to it. To go further than this and to propose a measure of protection for the weaving industry beyond what is necessary to compensate it for the increase of duty on its raw materials is beyond the scope of our present enquiry.

Increase of duty on silk mixtures recommended.

195. The present rate of duty on silk mixtures is 35 per cent. or 2 annas 3 pies per square yard whichever is higher. It would be obviously undesirable to leave the *ad valorem* duty at this level when we have raised the duty on silk goods to 83 per cent. If we do so the country would be flooded with silk mixtures. We do not know what proportion the value of silk bears to the total value of a mixed piece, but we assume that it is roughly 50 per cent. On a total *ex*-duty value of Rs. 100, the *ex*-duty value of the silk would be Rs. 50. If it is assessed at the proposed rate of 83 per cent. for silk, its value would be put up to Rs. 91-8-0 If the rest of the mixture continues to pay the present *ad valorem* duty of 35 per cent., the total value of the mixed piece with duty would be raised from Rs. 135 to Rs. 159. This gives us a duty of approximately 60 per cent. which we recommend for acceptance. We recommend no change in the specific duty recently imposed.

Increase of duty on silk yarns recommended.

196. Spun silk is at present included in the class of silk yarn, noils and warps and assessed at a duty of 25 per cent. It competes directly with raw silk and is priced at about the same level. We therefore recommend that it should be taxed at the same rate as raw silk. Since it is desirable to watch the extent of its competition with raw silk, we suggest that it should be entered separately in the trade returns. We make the same recommendation for thrown silk for the same reasons and recommend the same rates of duty for all other items included under the head of yarns, noils and warps.

Increase of duty recommended on artificial silk yarn.

197. We have dwelt on the competition which exists at present between natural silk and artificial silk yarn in Chapter X. At present the latter pays duty at the somewhat low rate of 18¾ per cent. We have noted the tendency on the part of weavers specially in Bombay to use it in increasing quantities as a substitute for natural silk. This tendency is encouraged alike by its extreme cheapness and by the comparatively low rate of duty imposed on it. We believe that if its price is left at its present low level it will drive out all other kinds of silk yarn and render our whole scheme of protection ineffective. At the same time we do not believe in putting up its price to the same level as that of natural silk as there is a well recognised difference of quality between the two. On a balance of these considerations we recommend that it should be subjected to a specific duty of Re. 1 per pound. This will still maintain a difference of at least one rupee per pound between it and the cheapest imported silk.

Change recommended in duties on artificial silk goods and mixtures.

198. We do not propose to touch the specific duties on artificial silk goods and mixtures which were imposed as recently as March 1933 because we believe they roughly correspond to the duty which we are proposing for artificial silk yarn. Without such a corres-

pondence, there is a danger that the import of one will be encouraged at the expense of the other. We propose however to raise the *ad valorem* rates of duty to the same level as those which we have proposed for silk goods and mixtures, in accordance with the existing practice of making no distinction between these classes of goods in this respect.

Other proposals.

199. Our arguments in previous chapters have made it clear that we do not rely on protection alone to help the industry through its present crisis. The success of its competitors is largely due to other measures which they have adopted for the improvement and encouragement of the industry. We are firmly convinced that unless similar measures are taken in this country protection will not only do no lasting good but may perpetuate some of the undesirable methods pursued in the industry. These measures which we recommend may be grouped under the heads of improvements in technical methods, improvements in marketing organisation and State assistance. Some of these have been mentioned already in preceding chapters but we summarise them again for convenience of reference.

Improvements in technical methods.

200. We have emphasised in previous chapters the necessity of research in all branches of the sericultural industry as the only practicable way of reducing the costs of production. On the analogy of similar research in other agricultural subjects, we think that this work will be best carried out on all-India as well as a provincial basis. Continuous research should be carried on in each of the three principal areas in the South, North and East by each of the provincial or State governments concerned either singly or in association with their neighbours into the best varieties of mulberry, the best yielding races of silkworms and the best methods of reeling for the export and the home markets. Every experiment should be subjected to the test of suitability to the physical and economic environment and to the ultimate touchstone of cost. The result so obtained by the provinces or States should be co-ordinated by an Imperial Sericultural Committee which we recommend should be set up as a branch of the Imperial Council of Agricultural Research. The Committee would serve as a clearing house for sericultural ideas and a controlling centre for sericultural practice. In order to enable it to perform these functions satisfactorily, we think it should be assisted by a whole time Imperial silk specialist. It would be the duty of the provincial sericultural bureaus to popularise the results of central research by suitable demonstrations and propaganda. We believe the most effective way of co-ordinating the results of central and local research is for the Central Council to subsidise provincial research. Such bounties, as has been proved by the history of France and Japan in this respect, are a more powerful agency for improving the industry than a general scheme of protection, as by their means a direct correlation between reward and endeavour is obtained.

Need for legislative and financial action.

201. There will however be some problems of the sericultural industry where such administrative and financial action will not suffice. In such cases, notably in the case of the problem of guaranteeing, the use of 100 per cent. disease-free seed, legislative measures may be necessary. We expect that the Imperial Council of Agricultural Research and the provincial sericultural departments would move their governments to take such action as they think necessary. How the Imperial Council of Agricultural Research will raise the funds it will require for this purpose, we do not feel called upon to discuss in great detail at the present stage. We presume that the new Federal Assembly will undertake to provide funds in such manner as it thinks proper for distribution in suitable proportions between it and the producing States and Provinces for the improvement of the industry.

Sericultural education.

202. For spreading a knowledge of the improved technical methods referred to above, it is desirable to reorganise the system of sericultural education in this country. At present practically nothing in this respect is being done except a few isolated efforts. It will be interesting to compare what is being done by India and Japan in this connection. Against a few sericultural classes conducted in elementary schools in Mysore and Bengal, Japan maintains sericultural sections in 241 schools, 3 colleges and 4 Universities where technical instruction in all branches of the subject is imparted not only to Japanese students but to foreigners, mostly Chinese, as well. We recommend the Imperial Sericultural Committee which we have proposed to explore the possibilities of providing some of these facilities in this country.

Improvements in marketing organisation.

203. In order to eliminate the excessive middlemen's charges which we have referred to in Chapter XI, we invite the attention of the provincial sericultural departments to the need of organising more co-operative societies than exist at present. They or the auxiliary organisation like the Silk Association we found in Bangalore and Calcutta should show a little more enterprise than they have done hitherto in investigating fresh markets for their local products. As far as possible silk should be produced in the form and quality which the consumer—the handloom weaver—demands. How much the good-will of the customers can be gained in this way is shown by the fact that the Japanese in adapting their methods of production to the needs of the American consumer saved to the American silk mills the enormous amount of 6½ million dollars in a short space of thirteen years. The Indian handloom weaver appreciates a silk with good winding qualities. We see no reason why this elementary requirement of the weaver should not be met by re-reeling Indian silk in suitable re-reeling establishments before sending it out in the market. We emphasise the need for starting cocoon markets, opening silk sale departments in different markets

in and outside India and removing the undoubted handicap to trade due to the existence of a multiplicity of weights and measures. We believe this latter problem can be best solved by enacting legislation on the lines of the Bombay Weights and Measures Act.

Conditioning Houses.

204. Similar measures will have to be adopted if an export market, as we believe it should be, is to be built up. For this a conditioning house is absolutely essential. We would indeed prefer that all silk should be graded and certified in a conditioning house before it is sold to the consumers. A conditioning house is a commercial organisation which carries out certain recognised tests in order to find out and certify the exact quality of the silk. The advantage of this certificate is that both purchaser and seller know the true quality of the commodity in which they are dealing, and are saved from the risk of error and fraud. This risk arises from the peculiar capacity of silk to absorb and release moisture against which the conditioning house provides by certifying any excess of moisture beyond the accepted standard of 11 per cent. over the absolute dry weight. Besides this, major tests are conducted for evenness and cleanness, and auxiliary tests for winding qualities, size, tenacity and cohesion. The fact that the bulk of Indian silk has hitherto been produced by charkha reeling and has not been properly graded probably explains why a conditioning house has not yet been started. If as we anticipate the production of filature silk increases and an expansion takes place in the export trade, it will be essential to establish a conditioning house. Various suggestions have been made as to the number and location of conditioning houses which would best suit the conditions of India, the Mysore Government suggesting the establishment of three houses one at Bangalore, one at Benares and one at Bombay, the Benares and the Bangalore houses to serve the principal producing areas in India and the Bombay house to serve for imported silk. We have neither the time nor the knowledge to enable us to make a definite recommendation. We are, however, of opinion that the establishment of a conditioning hous or houses is an essential part of the reorganisation of the industry which we consider to be a necessary preliminary to its development and we consider that this is one of the most important questions to be taken up by the Sericultural Committee of the Council of Agricultural Research as soon as it comes into being.

State in relation to the industry : Financial assistance.

205. To effect all these technical and marketing improvements, generous financial assistance both from the Imperial as well as the Local Governments is necessary. In no part of the world has the industry flourished without such assistance. The history of the sericultural industry in France is practically the history of the bounties paid to it from time to time by the French Government to enable it to make necessary improvements and enhance its competing power. Italian practice in this respect

has not been dissimilar. The amounts which the Japanese Imperial Government and each prefectural unit spends on the industry are given in Appendix D. A sum of 11,000,000 yens equal to Rs. 90,20,000 at the present rate of exchange of Rs. 82 to 100 yens is spent every year. These financial sacrifices have been more than justified by the enormous incomes which these countries obtain from their respective silk industries. In 1929 Japan exported silk and silk goods worth 7,81,041,000 and 149,954 yens respectively. If Bengal could only revive her old export trade by effecting suitable improvements in her industry, besides providing additional venues of employment for her population, she would remove her excessive dependence on one single industry, the jute industry. She would secure at the same time an increase in national income which would be no mean addition to her present straitened resources. We therefore recommend a generous measure of assistance both from the future Federal Government and the local administration concerned for promoting the objects of the industry since we believe that any expenditure incurred on it will be returned many times over in the shape of increased wealth and prosperity.

Better collection of statistics.

206. Another way in which the State can benefit the industry is to ensure a better collection of statistics pertaining to it. We have referred in more than one place to the difficulties we experienced in our enquiry owing to the absence of reliable statistics. When the State decides on a policy of active encouragement to the industry, it would be difficult to trace its results unless this serious defect is removed. We hope that the new statistical organisation which the Government of India propose to set up to watch the working of the Ottawa Agreement would be extremely useful in this connection; but it is essential that its activities should be supplemented by those of the local Governments and States concerned.

Safeguarding against dumping.

207. It is further desirable that the industry should be protected against further dumping. That dumping is going on at the present moment is clear from the facts about the bounty we have cited in Chapter II and the continued fall in the price of Canton filature silk as shown in Appendix E. Even during the course of our enquiry from December 1932 to April 1933, it fell by Rs. 1-2-0 to Rs. 1-4-0 per seer of 72 tolas. We got the fact of the bounty verified by a cable from the Commercial Counsellor to His Majesty's Consulate-General at Shanghai which is reproduced below:—

> "No export duty is charged on silk, silkproducts or silk mixtures. Bounty of 100 dollars per bale on raw silk registered before January last is payable to dealers on exports from Kiangsu and Chekiang provinces up to 31st May but may be extended."

In view of the possibility of the continuance of the bounty hinted at the end of the telegram and further fluctuations in exchange, it is conceivable that the price of Chinese silk may fall still futher. We have based our scheme of protection on the *ex-duty* prices of various qualities of silk set out in paragraph 183. If prices as represented by the *ex-duty* price of Rs. 3-11-0 per pound of Canton steam filature silk fall below this level there is a risk of our measure of protection proving inadequate. It will therefore be necessary for the Government of India to watch the course of prices in order that they may apply the relevant provisions of the recently passed Safeguarding of Industries Act, should the circumstances demand it.

Imperial Preference for the industry.

208. The State can help the industry in a more positive way by assuring for its products a larger market within the British Empire. It can get silk included within the present list of Imperial trade preferences. India is the only place of importance in the Empire where raw silk is produced. We have seen in Chapter II that it has been the traditional source of supply for the English weaving industry. We have seen further that silk is an important article in the munitions of war. Military necessity, economic considerations, historical traditions and political sentiment all alike point to the desirability of developing this Indian industry in the interests of India as well as the Empire. That the need for a source of silk supply on which the Empire could depend in its hour of necessity is being still felt is evident from the long tour which Mr. Breton undertook on behalf of the Silk Committee of the London Imperial Institute in British Africa and other parts of the Empire in 1931 in quest of possible sites for sericultural development. We believe if the industry is given the assistance we have proposed to enable it to reorganise itself, it would be in a position to supply most of the requirements of the English market at reasonable prices. We therefore recommend that the Government of India should take the earliest possible steps to secure for the industry a suitable preference in all parts of the Empire.

CHAPTER XV.

The Proposed Changes in the Tariff Schedule.

All our proposals for the modification of the tariffs are exhibited in the following statement :—

Serial No. as per Tariff Schedule printed by the Director General of Commercial Intelligence and Statistics.	Serial No. in the Statutory Schedule.	Name of Articles.	Present duty.	Proposed duty.
46	78	Textile materials, the following—		
		Raw silk . . .	25 per cent *ad valorem*	Rs. 2-6-0 per pound or 50 per cent ***ad valorem***, whichever is higher.
		Cocoons . . .	Ditto .	50 per cent ***ad valorem***.
58	84	Silkworm seeds (eggs) .	Ditto .	15 ,, ,,
123	100	Yarns and Textile Fabrics, that is to say—		
		1. Thrown silk . .	Ditto .	Rs. 2-6-0 per pound or 50 per cent ***ad valorem***, whichever is higher.
		2. Spun silk . . .	Ditto .	Ditto.
		3. Silk yarn, noils and warps and silk thread not otherwise specified.	Ditto .	Ditto.
119	43C	Artificial silk yarn and thread.	18¾ per cent *ad valorem*.	Re. 1 per pound.
125	45A	Silk or artificial silk mixtures, that is to say—		
		(*a*) Fabrics composed in part of some other textile than silk or artificial silk and in which any portion either of the warp or of the weft but not of both is silk or artificial silk ;	35 per cent *ad valorem* or two annas and three pies per square yard, whichever is higher.	60 per cent ***ad valorem*** or two annas and three pies per square yard, whichever is higher.
		(*b*) Fabrics not being silk or artificial silk on which silk or artificial silk is superimposed such as embroidered fabrics ;	Ditto .	Ditto.
		(*c*) Articles made from such fabrics and not otherwise specified (*see* serial No. 124).	35 per cent *ad valorem*	60 per cent ***ad valorem***.
		(*d*) Fents of not more than nine yards in length of fabrics specified in sub items (*a*) and (*b*).	Ditto .	Ditto.
126	133	Manufactures of silk not otherwise specified.	50 per cent *ad valorem*	83 per cent ***ad valorem***.
119A	45	Artificial silk piecegoods other than fents of not more than nine yards in length.	50 per cent *ad valorem* or four annas per square yard, whichever is higher.	83 per cent ***ad valorem*** or four annas per square yard, whichever is higher.
126	133	Manufactures of artificial silk not otherwise specified.	50 per cent. *ad valorem*.	83 per cent. ***ad valorem***.

CHAPTER XVI.

Summary.

CHAPTER I.

The silk industry is supposed to have orginated in China about 2600 years B. C. (paragraph 1). Climate is the main factor contributing to the success of the industry (paragraph 4). A dense and poor agricultural population is another essential condition (paragraph 5). These conditions favour the growth of the industry in its original home-China; its establishment in France and Italy was due to individual effort and public organisation; and Japan combining all the western improvements with her natural advantages of climate and population is now the largest exporter in the world (paragraph 6). The statistics of world production are incomplete, since for Asiatic countries they give only exports (paragraphs 7 and 8). India's share is probably about two per cent. of the total of 48,000 tons (paragraph 8). World production tends to decline in Western Europe and India and to increase in Eastern Europe and the Far East (paragraph 9). The world demand for silk has been falling steadily since the post-war boom and has collapsed since 1929 (paragraph 10). Consumption has not responded to the stimulus of low prices (paragraph 11). Through 1931 the depression deepened and attempts were made to adjust production to the reduced demand (paragraph 12). China in 1932 having lost a great share of her American market to Japan has been compelled to send more and more of her silks to India (paragraph 13).

CHAPTER II.

The mulberry silkworm probably came to India from China (paragraph 14). It was firmly established in India near the beginning of the Christian era. Its three principal areas are the Assam-Bengal plain, Kashmir and Mysore with the adjacent Kollegal taluk (paragraph 15). The East India Company's efforts to encourage the industry in Bengal led to improvements in the reeling process, but not in mulberry cultivation or in the races of silkworms (paragraphs 16 and 17). The export of silk from Bengal increased from 187,494 'small pounds' in 1772-75 to 500,000 'small pounds' in 1776-85 (paragraph 18). The introduction of foreign races of worms and mulberry was a failure and gave rise to an impression that *pebrine* disease was introduced with them (paragraph 19). After the Napoleonic war Bengal silk had to compete in Europe with French and Italian silks and its price fell (paragraph 20). The Company's monopoly was abolished in 1813 and it wound up its silk business in 1836 (paragraph 21). When between 1865 and 1872 the silkworms in Europe were attacked by *pebrine*, the Indian industry, having been neglected by Government since the Company gave up the business, was not in a position to take advantage of it as Japan did (paragraph 22). After 1857 the industry came to depend more and more on the home market, though there were large exports of silk waste (paragraph 23). About 1875 the industry began to decline due partly to disease which attacked worms alike in Bengal, Kashmir and Mysore, and partly to the higher returns offered by competing crops and occupations (paragraphs 24, 25 and 26). The revival of the industry in Kashmir dates from 1905 when new modern filatures were started (paragraph 27). But inspite of this exports from India declined from 235,000 kilos in 1909 to 34,000 kilos in 1914 (paragraph 28). The war created a boom of which Kashmir was in the best position to take advantage, and which caused the revival of the industry in Mysore. The boom lasted in India till 1922, since when prices have fallen (paragraph 29). At present exports of raw silk and waste alike have practically ceased. Chinese raw silk unable to find a market in America has come to India in increasing quantities at uneconomic prices, assisted by the abolition of export duty and the grant of a bounty on exports (paragraph 30). Kashmir silk having lost its export market is selling in India at depressed prices. Since December, 1931, when Japan left the gold standard there has been an enormous increase in the imports of her silk and artificial silk goods, which has depressed the weaving industry and driven it to the greater use of cheap substitutes for Indian silk (paragraph 31). The present production of mulberry silk in India is about two million pounds. This makes a poor show in comparison with Japan; but there are possibilities of great expansion (paragraph 32). The industry needs to be organised on modern lines. This can only be done with Government assistance. Provincial and State Governments are doing something; but their efforts need co-ordination by a central authority (paragraphs 34 to 41).

CHAPTER III.

The silkworms of India are (1) the *tasar*, (2) the *Muga*, (3) the *eri* and (4) several varieties of the mulberry worm (paragraph 43). Our enquiry is restricted to the mulberry silkworm (paragraph 44). There are four races of mulberry worms established in India; Kashmir and the Punjab rear foreign races from imported seed; and various hybrids are produced by crossing foreign with local races (paragraph 45). Kashmir and the Punjab are suitable for the univoltine worms; in other parts the multivoltine races prevail (paragraph 46). The life of the silkworm is divided into five ages in each of which special attention must be devoted to the temperature and ventilation of the rearing house and to the feeding, spacing and cleaning of the worms (paragraph 47). The chief diseases to which the worms are liable are *Pebrine*, *Flacherie*, *Grasserie*, *Muscardine* and the fly pest of Bengal and Assam. These cause a serious wastage (paragraphs 48 to 50).

CHAPTER IV.

Three species of mulberry are indigenous in India (paragraph 51). The Kashmir Government are trying to increase the number of trees grown in the State (paragraph 52). In Bengal efforts are mainly directed at popularising the cultivation of mulberry as a tree rather than as a bush on the score of economy (paragraph 54). The Mysore Government are trying to encourage the cultivation of mulberry as a tree and also to improve the local varieties by better cultivations and by the introduction of foreign varieties (paragraph 55). The methods of cultivation vary in different parts of the country as does the yield of leaf and the cost of cultivation (paragraphs 57 to 60).

CHAPTER V.

Seed production is a specialised branch of the industry, the objects being to secure the best type of cocoons and to avoid the risk of disease (paragraph 61). Between 1926-27 and 1932-33 the proportion of local seed used in Kashmir has risen from less than one-third to two-thirds (paragraphs 62 and 63). In Bengal disease-free seed is distributed in the form of seed cocoons by Government nurseries and by selected rearers, who together supply about half the province's requirements (paragraphs 65 and 66). In Mysore about 27 per cent. of the total seed requirements are met with seed which is in some degree protected; but only one fourth of this quantity is supplied in the form of cellular layings (paragraphs 67 and 68). The Madras Government at present are supplying only one-tenth of the seed needed in Kollegal, but hope to work up to fifty per cent. next year (paragraph 69). There is considerable variation in the prices at which disease-free seed can be bought by rearers (paragraph 70). It is essential, if the industry is to survive, that a complete supply of really disease-free seed must be organised and that legislation must be passed making the use of any other seed illegal: at the same time the price must not exceed that of unprotected seed. To encourage the use of disease-free seed we recommend the reduction of the duty on imported layings from 25 to 15 per cent. (paragraph 71).

CHAPTER VI.

Climate does not prove an obstacle to silkworm rearing (paragraph 72). The important matters to consider in successful rearing are the rearing house and its equipment, the proper incubation of the seed, adapting the treatment of the worms to its age, the adequate feeding, cleaning, and spacing of the worms, arrangements for the spinning, sorting and stifling of the cocoon (paragraphs 73 to 81). The yield of cocoons in India is low compared with that obtained in other countries (Paragraph 82). The consumption of mulberry leaf per pound of cocoons is high in Kashmir and Bengal (paragraph 83). Prices of cocoons have fallen since 1926 by just under fifty per cent. (paragraph 84).

CHAPTER VII.

The best method of stifling cocoons is by steam or hot air (paragraph 86). Silk reeled by charkha is apt to be dirty and irregular (paragraph 90). These defects can be avoided by using the Mysore Domestic Basin, which however is expensive (paragraph 91). Less than 240,000 lbs. of silk out of the total production of two million pounds was in 1931-32 reeled in filatures (paragraph 92). Most of the machinery required in a filature can be made in India (paragraph 94). Labour is fairly efficient and, except in Kashmir, cheap (paragraph 96). Kashmir silk is the best produced in India and Mysore silk compares favourably with imported Chinese silk (paragraph 99). The most economical size for a filature in India is probably 200 basins (paragraph 100).

CHAPTER VIII.

Defects in charkha reeled silk can to a great extent be removed by re-reeling, which costs generally eight to ten annas a pound (paragraph 102). Throwing or twisting is usually done by hand, but a few Throwing Mills have recently been started in South India (paragraph 103). On the whole Indian silk suffers a greater loss in degumming than foreign silk (paragraph 105). There is great scope for the employment of women in villages on re-reeling (paragraph 107).

CHAPTER IX.

The possibility of using silk waste was discovered in China (paragraph 108). Waste is produced at various stages from the cocoon to the Throwing Mill; the bulk is produced in the reeling operations (paragraph 110). Two mills which formerly spun silk yarn are now closed (paragraphs 111 and 112). It would help the Indian raw silk industry if more were opened. They would have plenty of raw material and a large market for their manufactures (paragraphs 115 to 117).

CHAPTER X.

The handloom weaver is the principal consumer of Indian raw silk (paragraph 118). The weaving industry exists all over India; it is most important in Bombay, Madras and the United Provinces; and the value of its annual production of silk goods exceeds seven crores of rupees (paragraph 119). Between 1928-29 and 1932-33 the consumption of silk on handlooms declined by about five per cent. (paragraph 120). The organisation of the industry is midway between the 'domestic' and the factory system (paragraph 121). The chief consideration which dictates the weaver's choice of raw material is price, and second comes convenience (paragraph 123). In both respects imported silk has the advantage over Indian silk (paragraph 124). The marketing of Indian silk is specially backward (paragraph 125). Artificial silk yarn is a serious competitor (paragraph 126) and so is spun silk (paragraph 127). Competition of imported goods is most severe in suitings and shirtings (paragraph 128). This competition and the general depression have brought about a serious fall in prices and in the weaver's daily earnings (paragraphs 129 and 130). Any measure such as an increase in the duty on raw silk which increases the weaver's cost of production will not be justified unless it is accompanied by an increase in the duties on silk manufactures (paragraph 131).

Chapter XI.

Indian silk is generally marketed through a series of merchants or commission agents (paragraph 132). The total Indian demand for raw silk is about 40 lakhs of pounds of which about half is met from Indian production (paragraph 134). A great defect of Indian silk is the absence of sorting or grading: even Kashmir silk which is classified after a fashion lacks cognisibility: and the classification of Bengal and Mysore charkha silk is uncertain and arbitrary (paragraphs 135 and 136). Every weaving centre is a market for Indian silk, and there are weaving centres all over the country (paragraph 137). At present there is no export market either for silk or for waste (paragraph 138). Mysore silk is usually sold on commission; in Bengal most sales are outright; and Kashmir silk is marketed through selling agents who are paid a commission (paragraphs 139 to 141). Marketing costs generally average about three annas a pound (paragraph 143). The chief features of the import statistics are the abnormal quantities imported from China and Japan in 1932-33, and the serious fall in value in the last three years (paragraph 144). The Customs classification of imports, by place of shipment and colour, is illogical and inconvenient (paragraph 145). The system of tariff valuation is unsatisfactory and should be abolished (paragraph 146). Imported silk should be classified according to quality, based on the process of manufacture or the type of cocoon used: (1) filature silk, (2) re-reeled silk, (3) hand reeled silk, and (4) waste products and dupion hand reeled silks (paragraph 147). Imported filature silks compete indirectly with Indian filature silks and directly with the first quality charkha silk; imported re-reeled silks compete with first quality charkha silks; filature dupions and all native reeled silks—except the coarsest—compete with second and third quality charkha silks; silk made by hand from rejected or double cocoons does not really compete with any Indian silk (paragraph 148). Imported silk has no freight or other marketing advantage or disability as compared with Indian silk (paragraph 149). The low prices of Chinese silk are due partly to more efficient methods of rearing, but mainly to superior modern methods of reeling, helped by the abolition of export duty and other State aid (paragraph 150). Chinese competition, helped by falling exchanges, has been serious for the last ten years and deadly for the last three; but it is not likely to last if the European and American demand revives (paragraphs 151 and 152). A more permanent menace to the Indian raw silk industry is the increasing competition of artificial silk yarn and good (paragraph 153).

CHAPTER XII.

Our problem is not the protection of an infant industry but the saving of an old established industry from extinction (paragraph 154). The fact that much of the silk is produced in the States of Kashmir and Mysore does not bar the claim to protection (paragraph 155). The industry enjoys the advantage of an agricultural population with low wages and demanding a subsidiary occupation (paragraph 156). It also has a climate suitable for the cultivation of the mulberry and the rearing of silkworms (paragraphs 157 and 158). The indigenous races of silkworms are comparable with the multivoltine races of South China, and though the average yield of cocoons is lower in India, it can be and is being improved. The industry is capable of expansion and can produce all the cocoons for which there may be a demand (paragraph 159). Power is available at reasonable rates (paragraph 160). Labour is abundant, reasonably efficient and, except in Kashmir, cheap (paragraph 161). The market is capable of expansion in many directions (paragraph 162). Conditions at the time of our enquiry are unsettled and abnormal (paragraph 163). The dangers which have threatened the industry are the loss of its export market, a shrinkage in the world demand for silk and silk waste, and a corresponding fall in the Indian demand for silk, a tendency even in this restricted field to replace Indian raw silk by cheaper substitutes, the reduction in the price of Chinese silks, the loss of the market for silk waste, and, superimposed upon all these burdens, the depression of the silk weaving industry caused by the continued dumping of cheap manufactured goods (paragraph 164). The causes which have contributed to bring about this accumulation of disasters have been the fall of world prices and the depreciation of Chinese exchanges from 1926 onwards, the American crisis of 1929 and the consequent disorganisation of the world's financial and economic arrangements, the general decline of purchasing power, and finally the sharp fall in Japanese exchange since the abandonment of the gold standard in December 1931 and the bounty granted to exports of Chinese silk (paragraph 165). We cannot anticipate the period for which unfair competition will last. The raw silk industry occupies an important place in the economic structure of India; its protection is desirable in the interests of the agricultural as well as the weaving industry (paragraph 166). Its chief need is reorganisation which can only be successful if undertaken with Government assistance (paragraph 167). Apart from the unfair competition resulting from the depreciation of exchanges and grant of bounties the industry even now is nearly able to hold its own (paragraph 168). We recommend protection for five years while the industry is reorganised and a further enquiry at the end of that period to ascertain what use the industry has made of its opportunity and whether it needs further protection (paragraph 169).

CHAPTER XIII.

The first stage of investigation into the cost of production deals with the cost of cocoon production, the most important item of which is the cost of cultivating mulberry (paragraph 170). There is considerable variation in the costs stated to us; but we have come to the conclusion that the present cost is about four annas a pound in Bengal and four and a half annas elsewhere (paragraph 171). We have decided to base our recommendation on a price for cocoons of five annas a pound (paragraph 173). There are similar variations in the costs of reeling by charkha (paragraph 174). We estimate the works cost of producing a pound of raw silk by charkha at Rs. 5-12-4, Rs. 5-1-4 and Rs. 4-10-8 for 1st, 2nd and 3rd quality silk (paragraph 175). Adding overheads we arrive at fair selling prices of Rs. 6-2-6, 5-4-3 and 4-13-5 (paragraph 176). There is variation again in works expenditure between one filature and another. We estimate the works cost of producing a pound of silk in a filature of economical size working to full capacity at Rs. 6-4-0 and the fair selling price at Rs. 6-10-9 (paragraphs 177 to 181). To estimate the measure of protection needed we compare (1) the prices of imported filature and re-reeled silks with the price of 1st quality charkhas silk and (2) the prices of imported native-reeled silks and filature dupions with those of 2nd and 3rd quality charkha silks (paragraph 182). The average price of imported filature and re-reeled silks is Rs. 3-12-0 and the average price of native-reeled and filature dupion is Rs. 2-10-7. The difference between Rs. 3-12-0 and the price of 1st quality charkha silk (Rs. 6-2-6) is Rs. 2-6-6; and the difference between Rs. 2-10-7 and the average of the prices of 2nd and 3rd quality charkha silk (Rs. 5-0-10) is Rs. 2-6-3; we recommend a specific duty of Rs. 2-6-0 a pound (paragraphs 183 and 184). This will afford enough protection for filatures as well as for charkha silk (paragraph 185). We also recommend that the alternative *ad valorem* rate of duty be raised to 50 per cent. (paragraph 186). We believe that this rate is adequate and not excessive (paragraph 187). We recommend that it apply for a period of five years and that it be applied to all classes of raw silk; we also recommend that the 50 per cent. *ad valorem* duty be applied to cocoons (paragraphs 189 to 191). We suggest that emergency action be taken on our report under the provisions of the Safeguarding of Industries Act, 1933 (paragraph 192).

CHAPTER XIV.

We recommend that the *ad valorem* rate of duty on silk goods be raised to 83 per cent. (paragraph 194). We also recommend that the *ad valorem* rate of duty on silk mixtures be raised to 60 per cent. (paragraph 195). We recommend that all silk yarns, including thrown silk and spun silk, be liable to the duty which we recommend for raw silk. We also recommend that thrown silk and spun silk be entered separately in the trade returns (paragraph 196). We recommend that a specific duty of Re. 1 a pound be levied on artificial silk yarn (paragraph 197). We do not propose to touch the specific duties on artificial silk goods and mixtures but we recommend that their *ad valorem* rates of duty be raised to the same level as those which we have proposed for silk goods and mixtures (paragraph 198). Research should be carried out by provincial and State Governments and their results co-ordinated by a sericultural committee of the Council of Agricultural Research, which should arrange for such financial assistance as may be required and suggest legislative action when necessary (paragraphs 200 and 201). This committee should explore the possibility of improving facilities for sericultural education (paragraph 202). Improvements in marketing should be undertaken, and the establishment of conditioning houses should be taken up (paragraphs 203 and 204). Generous financial assistance should be provided (paragraph 205). The collection of statistics should be improved (paragraph 206). The Government should watch the course of prices and be ready to apply the provisions of the Safeguarding of Industries Act, if need arises (paragraph 207). Steps should be taken to include raw silk in the list of Imperial preferences (paragraph 208).

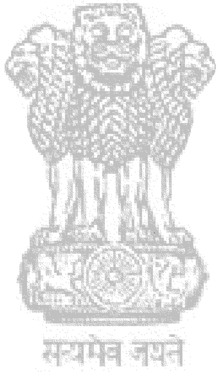
FAZAL I. RAHIMTOOLA,
President.

G. T. BOAG,
Member.

H. R. BATHEJA,
Member.

सत्यमेव जयते

BANGALORE;
The 15th May, 1933.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APPENDIX A.

Programme of visits made and evidence recorded by the Tariff Board.

19th December 1932	Visited— (1) Bangalore Silk Filature, Bangalore. (2) Sri Ram weaving shed, Bangalore. (3) Sri Ram Silk Throwing Factory, Bangalore. (4) Some handloom silk weavers and silk merchants in their places of business in the Jumma Masjid Street, Bangalore.
20th December 1932	(1) Inspected the working of a sericultural co-operative society at Mangalwarpet and the country charkha at Nidaghatta. (2) Received representations at several villages on the way. (3) Visited the Mysore Government Silk Filature and the Weaving Factory.
21st December 1932	(1) The sericulturists and co-operative society members met the Board at Ummattur where some of the rearing houses and mulberry garden were visited. (2) Visited Neggawadi, where a Mysore Domestic Basin Unit was inspected and the rearings of certain villagers were examined. (3) Met the sericulturists of the neighbouring villages at Santhemarahalli and at Mugur where also the working of the country charkha was examined. (4) Met some sericulturists at Kurubur and Alagoda.
23rd December, 1932	(1) Met some seed cocoon rearers at Bidadi. (2) Visited a rearing house, reeling establishment and a silk twisting school at Closepet. (3) Visited reeling establishments at Chikkamudavadi and at Thimmasandra. (4) Met rearers at Kotahalli. (5) Visited the Government farm at Channapatna and saw the working of its various sections—also met rearers, silk merchants and others engaged in the silk industry.
16th January, 1933	Visited weaving centres in Poona.
13th February, 1933 14th February, 1933	Examined representatives of the Kashmir Government at Delhi.
22nd February, 1933	Examined the Bengal Co-operative Silk Union and silk merchants—also visited the Bengal Co-operative Silk Union, Malda.
23rd February, 1933	Visited the Government sericultural farm at Piasbari, Malda.
25th February, 1933	Examined representatives of the Government of Bengal at Calcutta.
1st March, 1933	Examined representatives of the Japanese and Shanghai Silk Merchants' Association, Bombay.
6th March, 1933	Examined the representative of the Government of Bombay.

13th March, 1933 . . .	Examined representatives of the Mysore Chamber of Commerce.
14th March, 1933 . . .	Examined representatives of the Mysore Raw Silk Merchants' Association.
15th March, 1933 . . . 16th March, 1933 . . .	Examined representatives of the Mysore Government.
18th March, 1933 . . .	Examined the representative of the Bangalore silk filature.
19th March, 1933 . . .	Visited the Government Textile Institute, Madras, and some handloom weavers' houses.
21st March, 1933 . . .	Visited the silk filature at Kollegal and some rearing and weaving centres.
22nd March, 1933 . .	Examined representatives of the Mysore Silk Association.
23rd March, 1933 . .	Examined representatives of the Government of Madras.
25th March, 1933 . .	Visited chowki rearing establishments at Vadigenahalli and met some representatives of the silk industry. Visited mulberry gardens at Chickballapur and a grainage and met representatives of silk dealers both of Siddlaghatta and Chickballapur.
28th March, 1933 . .	Examined representatives of the Government of Mysore.

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APPENDIX B.

Extract from letter from Mr. K. Shamsuddin Khan, B.A., Assistant Superintendent of Sericulture, Mysore.

The Silk spinning plant of 6,000 spindles would be considered the smallest size in Japan.

1. The plant is for Mysore waste of " C " grade, " B " grade can also be used only with some reserve gained in the degumming, opening, filling process. The working hour per day should be 8 hours.
2. The amount of waste necessary when using " C " grade—1,750 lbs.
3. The amount of production of silk thread per day—Approx. 325 lbs.
4. The number of labourers—Men 65, Women 212. (Estimated according to Japanese labourers so that it would be increased when employing unskilled Indians.)
5. The number of Engineers (including the Chief Engineer)—6. (One Superintendent each for washing and degumming, opening and dressing, slubbing and roving, spinning and twisting, gassing and finishing.)
6. The number of Assistant Engineers for the above—5.
7. The number of Secretaries and Clerks—10.
8. Quantity of water (per day of 8 hours).—50,000 c.ft.
9. Quality of water—soft water.
10. Power—400 H.P.
11. Coal (for drying and humidifying) (per day)—7,500 lbs.
12. The Japanese " Kibiso " compared with Mysore waste " B " and " C " grades. " B " will be similar to " Kibiso " of ordinary grade and the price of " C " will be half of the price of " Kibiso ".
13. The comparison in the prices between " B " and " C "—2:1.
14. The salary of the Superintendent per month is Yen 1,000 Gold and travelling expenses to and fro is Yen 2,500. The Superintendent cannot do everything and that one Engineer for from degumming to dressing, one for from slubbing to finishing are necessary. The salary for the above-mentioned Engineer is Yen 500 Gold per head, and the travelling expenses to and fro—Yen 2,000.
15. The plan of the factory is shown in the attached drawing.

Estimate of the cost of machinery required for a waste plant of economic size.

	Yen.
1. The estimate for spinning and preparing machinery for 6,000 spindles count No. 135, waste silk plan, using Mysore " C " grade material f.o.b. Kobe	359,965·00
2. Gas generating plant	38,000·00
3. Steam boiler and steel chimney and drying apparatus	15,000·00
4. Mill gearing	10,600·00
5. Driving Motors (except motors for spinning, twisting and doubling frames)	4,000·00
6. Humidifying apparatus	8,500·00
7. Repairing shop machinery	11,150·00
8. Water tank and feed pump	7,600·00
9. Yarn testing machinery	1,175·00
10. Bobins, cans and sticks	16,640·00
Total estimate of all machinery—	
C.i.f. Madras	492,730·00
F.o.b. Kobe	472,630·00

The estimate for spinning and preparing machineries for 600·00 spindles (135's yarn), waste silk plant using " C " material in f.o.b. Kobe.

		Sets.	Yen.	Yen.
1.	Softening tubes	18	455·00	8,180·00
2.	Steam pan, 6′ 0″ × 6′ 0″	4	2,635·00	10,500·00
3.	Washing machine, 12 stampers . . .	1	......	1,470·00
4.	Washing machines (water jet type) . .	1	......	835·00
5.	Hydro-extractor, 36″ cage, underdriven .	2	1,100·00	2,200·00
6.	Cocoon opener with fillet	3	1,350·00	4,050·00
7.	Medium Filling Engine	12	640·00	7,680·00
8.	Circular Dressing Frame with fillet and slider	14	1,950·00	27,300·00
9.	Small filling engine	28	420·00	11,760·00
10.	Intersecting screw gill spreader for medium draft	9	1,300·00	11,700·00
	Intersecting screw gill spreader for short draft	9	1,280·00	14,520·00
11.	Open screw gill set frame for long draft .	5	980·00	4,900·00
	Intersecting screw gill set frame for short draft	3	1,100·00	3,300·00
12.	Intersecting screw gill drawing frame for long draft, 4 heads	4	3,500·00	14,000·00
	Intersecting screw gill drawing frame for short draft, 4 heads	3	3,300·00	9,900·00
13.	Screw gill roving frame for long draft, 40 spindles	4	4,900·00	19,600·00
	Screw gill roving frame for short draft 40 spindles	2	4,720·00	9,440·00
14.	Double roving frame for long draft, 60 spindles	4	3,950·00	15,800·00
	Double roving frame for short draft, 60 spindles	2	3,850·00	7,700·00
15.	Ring spinning frame for long draft with individual motor, 300 spindles . .	16	5,150·00	82,400·00
	Ring spinning frame for medium draft with individual motor, 300 spindles .	4	5,150·00	20,600·00
16.	Quick traverse winder, 120 drum, with individual motor	5	1,380·00	4,140·00
17.	Ring twisting frame, 272 spindles with individual motor	10	4,100·00	41,000·00
18.	Gassing and cleaning frame . . .	12	1,650·00	19,800·00
19.	Controlling machine	4	1,120·00	4,480·00
20.	Reeling machine 80 hanks	4	480·00	1,920·00
21.	Bundling press	1	......	380·00
22.	Baling press (for 20 bales)	1	......	1,250·00
23.	Experimental frame, 40 spindles, for one side spinning and the other twisting with individual motor	1	......	2,150·00
			TOTAL .	359,965·00

APPENDIX C.

Cost of production for various kinds of handwoven goods.

Class of cloth (Typical).	Dimensions.	Material.	Cost.						Sale price.	Production per day.	Weaver's earning per day.
			Raw material.	Winding and Twisting.	Dyeing.	Weaving.	Other charges.	Total.			
			Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.		Rs. A. P.
KASHMERE.											
Sarees, Dupattas or shirtings.	45″×7 yards	Spun Silk	4 8 0	0 2 6	0 8 0	1 1 6	0 5 0	6 9 0	7 0 0	8 yards	1 4 0
MYSORE.											
Saree	45″×9 yards	Mysore country silk 2⅝ lbs. raw silk.	13 1 0	1 10 0	2 6 0	8 0 0	2 2 0	27 3 0	30 10 0	⅗ yards	0 8 6
MADRAS.											
1. Saree, Plain	45″×9 yards	....	9 8 0	1 4 0	2 8 0	6 0 0	..	19 4 0	21 0 0	1⅔ yards	1 1 10
2. Saree, figure in border.	45″×9 yards	....	13 0 0	1 4 0	2 8 0	7 0 0	..	23 12 0	25 0 0	1⅙ yards	0 14 6
3. Saree, Solid border.	45″×9 yards	....	14 8 0	1 4 0	2 8 0	9 0 0	..	27 4 0	30 0 0	⅚ yards	0 13 4
4. Saree, Check pattern with gold thread borders.	45″×9 yards	....	16 0 0	1 4 0	2 8 0	12 0 0	..	31 12 0	35 0 0	¾ yards	1 0 0
5. Angavastram, Plain.	45″×3 yards	....	2 0 0	0 9 0	1 0 0	1 5 0	..	4 14 0	6 12 0	1⅔ yards	0 11 8
6. Angavastram, with gold thread borders.	45″×3 yards	....	3 8 0	0 10 0	1 0 0	1 10 0	..	6 12 0	8 12 0	1⁵⁄₉ yards	0 13 6

APPENDIX C—*contd.*

Class of cloth (Typical).	Dimensions.	Material.	Cost.						Sale price.	Production per day.	Weaver's earning per day.
			Raw material.	Winding and Twisting.	Dyeing.	Weaving.	Other charges.	Total.			
			Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.		Rs. A. P.
MADRAS—*contd.*											
7. Rumals . .	45″ × 2¼ yards .	....	7 0 0	0 10 0	0 10 0	2 0 0	..	10 4 0	11 0 0	1½ yards	1 3 2
8. Dhoties, Plain .	52″ × 4 yards .	....	6 0 0	0 12 0	0 4 0	1 8 0	..	8 8 0	10 0 0	1⅔ yards	0 10 0
9. Dhoties, Solid border.	52″ × 4 yards .	....	6 0 0	0 12 0	0 8 0	3 0 0	..	10 4 0	11 0 0	1½ yards	0 13 4
10. Shirtings, plain .	45″ × 25 yards .	....	15 0 0	10 0 0	..	9 12 0	..	34 12 0	37 8 0	1⅔ yards	0 10 5
11. Shirtings, striped	45″ × 25 yards .	....	15 0 0	10 0 0	1 0 0	10 12 0	..	36 12 0	40 0 0	1⅔ yards	0 11 6
12. Suitings . .	28″ × 25 yards .	....	20 0 0	8 0 0	..	6 4 0	..	34 4 0	37 8 0	3 yards	0 12 0
13. Turban Cloths .	45″ × 4 yards .	....	5 8 0	0 12 0	..	1 10 0	..	7 14 0	9 0 0	1⅝ yards	0 11 11
14. Blouse materials with solid borders.	45″ × 4½ yards .	....	7 4 0	0 10 0	1 4 0	4 8 0	..	13 10 0	15 0 0	¾ yards	0 13 4
15. Silk Brocades .	45″ × 9 yards .	....	37 0 0	1 8 0	2 8 0	35 0 0	..	76 0 0	85 0 0	11/14 yards	2 6 0
UNITED PROVINCES.											
1. Sari . . .	..	Silks (katan) 18 tolas Gold thread 16 tolas.	5 10 0 16 0 0	..	0 10 0*	18 0 0	3 4 0	43 8 0	..	..	..
2. Suiting . .	..	140 s/2 spun silk 1 seer.	9 4 0	..	..	2 0 0	0 10 0	11 14 0	..	..	..
3. Got . . .	½″ to 6″ × 20 yards	Badla warp and cotton weft.	..	..	..	..	..	..	0 8 0 to 1 8 0 per tola.	..	

4. Dupatta	50″-60″ × 3 yards	Kora and organzine	..	..	..	..	..	..	6 0 0 to 150 0 0 each.	..	..
5. Handkerchiefs	18″ to 36″ square.	Ditto	..	..	..	..	..	..	1 0 0 5 0 0 each.	..	..
6. Gown pieces	40″ to 54″ × 3 to 7 yards.	Kora, organzine and spun silk.	..	..	..	..	..	..	12 0 0 to 150 0 0 per piece.	..	..
7. Brocades	28″ to 30″ × 4¾ Yards.	Mercerised cotton, spun silk and raw silk for warp and weft.	..	..	..	..	..	..	5 0 0 to 400 0 0 per piece.	..	..
CENTRAL PROVINCES.											
1. Sari-Cotton with silk (Chinese).	45″ × 9 yards	40s. Cotton warp and weft and 8 ozs. of Silk— Cotton Yarn 1¼ lbs. Silk ½ lbs.	1 0 0 2 3 0	0 8 0	1 3 0†	2 2 0	..	7 0 0	7 0 0	4½ Yards	1 1 0
2. Sari-Cotton with silk (Kashmere).	45″ × 9 yards	40s. Cotton warp and weft and 8 ozs. of silk— Cotton Yarn 1¼ lbs. Silk ½ lbs.	1 0 0 3 13 0	0 5 0	0 14 0	1 0 0	..	7 0 0	7 0 0	4½ yards	0 8 0
3. Sari-Cotton with silk (Chinese).	45″ × 9 yards	40s Warp 20s Weft Silk 10 tolas.— Cotton Yarn 40s-½ lbs. Cotton Yarn 20s-1 lb. Cotton Yarn 60s-2 hanks. Silk 10 tolas	0 6 6 0 10 0 0 0 9 1 1 6	0 4‡ 0	0 8 0	1 9§ 3	..	2 14 9	4 8 0	4½ yards	0 11 1·5

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* Includes 0-2-0 degumming charges.
† Includes also degumming charges.
‡ Includes also opening charges.
§ Includes also 0-3-0 for warping (as the weavers purchase ready made warps).

APPENDIX C—*contd.*

Class of cloth (Typical).	Dimensions.	Material.	Cost.						Sale price.	Production per day.	Weaver's earning per day.
			Raw material.	Winding and Twisting.	Dyeing.	Weaving.	Other charges.	Total.			
			Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.		Rs. A. P.
BIHAR AND ORISSA.											
1. Tasar silk saree	44″ × 5 yards	....	4 8 0	0 8 0	0 3 0	2 5 0	..	7 8 0	7 8 0	1¾ yards	0 12 4
2. Spun silk saree	45″ × 5 yards	2 10/2 m/s mulberry	4 8 0	0 10 0	0 4 0	0 10 0	..	6 0 0	6 0 0	5 yards	0 10 0
3. Bafta Loongi	44″ × 4½ yards	....	Tasar. 0 8 0 Cotton 1 0 0	0 10 0	0 6 0	0 10 0	..	3 2 0	3 8 0 per pair.	4½ yards	0 10 0
4. Bafta Handkerchief.	18″ × 18″	....	Tasar 0 1 6 Cotton 0 0 6	..	..	0 1 0	..	0 3 0	0 3 0 per piece.	6 yards	0 12 0
5. Spun silk shirting.	32″ × 9 yards	140/2 m/s	5 13 6	0 8 0	0 4 0	0 10 0	..	7 3 6	7 5 0	7½ yards.	0 8 4
PUNJAB.											
1. Gulbadan	26″ × 30 yards	Kashmir or Yarkand raw silk in warp and weft. Warp 2 lbs. weft 2¼ lbs.	28 0 0	3 8 0	2 0 0	11 0 0	2 0 0	46 8 0	1 12 0 per yard.	2 to 4 yards.	0 11 9 to 1 7 6
2. Daryai-reel	26″ × 30 yards	Do.	28 0 0	3 0 0	2 0 0	11 0 0	2 0 0	46 0 0	1 12 0 per yard.	3 to 6 yards.	1 1 7 to 2 3 2
3. Daryai-reel	22″ × 64 yards	Mercerised cotton warp and artificial silk weft. Warp-5 lbs., weft 4½ lbs.	12 0 0	1 0 0	1 8 0	6 0 0	1 8 0	22 0 0	0 5 3 per yard.	Do.	0 4 6 to 0 9 0

4. Daryai-gula .	26″ × 54 yards .	Spun silk warp and raw silk weft. Warp 2½, weft 2½ lbs.	40 0 0	1 0 0	2 0 0	10 0 0	1 0 0	54 0 0	1 2 0	3 to 6 yards.	0 8 11 to 1 1 10
5. Sarees . .	45″ × 5 yards .	Spun silk warp and weft 11 oz. to 15 oz. per saree.	2 0 0	0 4 0	0 4 0	1 0 0	0 8 0	4 0 0	4 to 5 per saree.	2 to 6 yards on handloom.	0 5 5 to 1 3 2
6. Dupattas . .	1½ × 3 yards .	Spun silk warp and weft 8 to 11 oz. per piece.	1 6 0	0 3 0	..	0 9 0	0 6 0	2 8 0	3 to 5 per dupatta.	2 to 6 yards on handloom.	0 6 0 to 1 2 0
7. Gota (80 tolas and 8 mashas).	9½ yards . .	Lametta and art silk for warp and real silk for weft. Warp, 1 lb. 11 oz. Lametta—art. silk 3 oz., real silk 3 oz.	50 0 0	1 8 0	1 0 0	1 0 0	0 8 0	54 0 0	0 13 0 per tola.	30 to 50 yards by primitive arrangement.	3 2 6 to 5 4 2
8. Loongis head .	27″ × 6 yards .	Real silk warp and weft. Warp 4 oz., weft 4 oz.	6 0 0	0 4 0	0 8 0	1 0 0	0 8 0	8 8 0	5 0 0 to 15 0 0 per loongie.	2 to 15 yards.	0 5 4 to 2 8 0
9. Loongi terhband	25″ × 6 yards .	Real silk warp and weft. Warp 6 oz., weft 6 oz.	10 0 0	1 0 0	1 0 0	3 0 0	1 0 0	16 0 0	3 4 0 to 30 0 0 per piece.	,,	1 0 0 to 7 8 0
10. Handkerchiefs .	22″ × 145 yards .	Mercerised cotton warp and art. silk weft.	16 0 0	1 0 0	2 0 0	3 0 0	0 8 0	22 8 0	0 1 6 each.	4 to 20 handkerchiefs.	0 0 10 to 0 4 0
11. Shirtings . .	28″ × 25 yards .	Spun silk warp and weft. Warp 1½ lb., weft 1½ lb.	11 0 0	0 8 0	0 8 0	4 12 0	1 8 0	18 4 0	0 10 0 to 1 8 0 per yard.	5 to 15 yards on handloom.	0 15 2 to 2 13 7
12. Suitings . .	28″ × 25 yards .	Spun silk warp and weft. Warp 3 lbs., weft 3 lbs.	16 8 0	0 8 0	0 8 0	4 12 0	1 8 0	23 12 0	1 0 0 to 3 0 0 per yard.	,,	,,
13. Phulkaris . .	1½ yards to 3 yards.	Khaddar cloth embroidered with Kotha or sai silk yarn called "Pat" 12 oz. to 1 lb.	5 8 0	0 8 0	1 0 0	7 0 0	1 0 0	15 0 0	15 0 0 to 50 0 0	3/10th to 1/10th of a piece (needle work by ladies).	0 11 2 to 0 3 8

APPENDIX C—*contd.*

Class of cloth (Typical).	Dimensions.	Material.	Cost.						Sale price.	Production per day.	Weaver's earning per day.
			Raw material.	Winding and Twisting.	Dyeing.	Weaving.	Other charges.	Total.			
			Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.		Rs. A. P.
BOMBAY.											
1. Plain Rasta Saree	50"×9 yards	Cotton yarn—1 lb. 40s. Silk yarn—4 oz. 210/2.	2 0 0 2 8 0	..	..	1 8 0	..	6 0 0	7 0 0	4½ yards	0 12 0
2. Bodice Cloth	32"×10 yards	Cotton yarn—6 oz. Art Silk—6 oz.	1 8 0 0 8 0	..	..	1 0 0	..	3 0 0	4 0 0	10 yards	1 0 0
3. Bodice Cloth	32"×8 yards	Cotton yarn—8 oz. Art silk—8 oz.	2 0 0 0 10 0	..	..	1 0 0	..	3 10 0	4 8 0	8 yards	1 0 0
4. Bodice Cloth	32"×9½ yards	Cotton yarn—8 oz. Art silk—8 oz.	2 0 0 0 10 0	..	..	1 2 0	..	3 12 0	4 12 0	9½ yards	1 2 0
NASIK.											
1. Silk bordered saree with squares.	42"×8 yards	Cotton 1 lb. 2 oz. Silk yarn—2 oz. Art silk—2 oz.	1 8 0 1 4 0 0 2 0	..	..	1 0 0	..	3 14 0	4 8 0	4 yards on fly shuttle looms.	0 8 0
2. Mirani Saree with silk borders.	42"×8 yards	Cotton 1 lb. 2 oz. Silk yarn—2 oz. Art silk—2 oz.	1 8 0 1 4 0 0 2 0	..	..	1 0 0	..	3 14 0	4 8 0	4 yards	0 8 0
YEOLA.											
1. Paithani	50"×9 yards	Cotton yarn—10 oz. Silk yarn—2 lbs.	24 0 0* 17 8 0*	..	..	8 0 0	..	49 8 0	55 0 0	¾ yards.	0 8 6
2. Pitambar	45"×8 yards	Imported silk 1 lb. 4 oz.	11 0 0	..	..	2 0 0	..	13 0 0	15 0 0	1⅓ yards.	0 5 4
3. Silk saree with squares.	45"×8 yards	Imported silk 1 lb. 4 oz.	11 0 0	..	..	2 0 0	..	13 0 0	15 0 0	1⅓ yards	0 5 4

4. Basta Saree	45″ × 8 yards	Imported silk 1 lb. 4 oz.	11 0 0	..	..	2 0 0	..	18 0 0	15 0 0	1⅛ yards	0 5 4
5. Alpak—Patal	48″ × 8¼ yards	Cotton Yarn—1 lb. 4 oz. Silk—6 oz.	0 11 0 3 8 0	..	..	1 8 0	..	5 11 0	7 0 0	1$\frac{5}{12}$ yards	0 4 0
6. Bodice Cloth with gold thread border.	38″ × 2¼ yards	Cotton—2 oz. Silk—6 oz.	3 0 0* 3 8 0*	..	..	1 4 0	..	7 12 0	8 0 0	22·5 inch	0 5 0
POONA.											
1. Buttedar Paithani.	50″ × 9 yards	Cotton—1 lb. 8 oz. Silk—2 lbs.	60 0 0* 26 0 0*	..	..	8 0 0	..	94 0 0	95 0 0	⅜ yar	0 8 6
2. Plain Paithani	50″ × 9 yards	Cotton—5 oz. Silk—2 lbs.	9 0 0* 12 0 0*	..	..	2 8 0	..	23 8 0	25 0 0	1⅛ yards	0 5 0
3. Shalu	50″ × 9 yards	Cotton—5 oz. Silk—2 lbs.	9 0 0 12 0 0	..	..	2 8 0	..	23 8 0	25 0 0	1⅜ yards	0 5 0
4. Shella with gold thread palar.	54″ × 4 yards	Cotton—1 lb. 8 oz. Silk—8 oz.	60 0 0 6 0 0	..	..	12 0 0	..	78 0 0	80 0 0	$\frac{1}{5}$ yards	0 9 7
5. Pittambar or kad	48″ × 5 yards	Cotton—3 oz. Silk—13 oz.	6 0 0 9 0 0	..	..	1 8 0	..	16 8 0	17 8 0	1¼ yards	0 6 0
6. Buttedar silk kahn.	36″ × 3 yards	Cotton—2 oz. Silk—8 oz.	4 12 0 6 0 0	..	..	4 0 0	..	14 12 0	15 8 0	¾ yards	1 0 0
7. Plain silk Bodice Cloth.	36″ × 3 yards	Cotton—3 oz. Silk—5 oz.	6 0 0 3 0 0	..	..	1 0 0	..	10 0 0	11 0 0	¾ yards	0 4 0
TATTA.											
1. Loongi	27″ × 12 yards	Cotton—12 oz. Silk—1 lb.	0 12 0 6 8 0	..	1 8 0	4 8 0	..	13 4 0	16 0 0	2 yards	0 12 0
ILKL.											
1. Kali Chandrakala saree plain.	50″ × 9 yards	Cotton—1 lb. Silk—4 oz.	1 12 0 2 13 0		..	3 4 0	..	7 6 0	8 0 0	1¼ yards	0 8 8
2. Silk Khaddi Saree topa body	50″ × 9 yards	Cotton—12 oz. Silk—8 oz.	1 3 6 5 0 0	..	..	4 10 0	..	10 13 6	12 0 0	1⅛ yards	0 9 2
3. Kali Chandrakala topa body.	50″ × 9 yards	Cotton—1 lb. Silk—5 oz.	1 10 0 3 2 0	..	..	3 10 0	..	8 6 0	9 4 0	1⅞ yards	0 8 4

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* Gold thread.

APPENDIX C—*contd.*

Class of cloth (Typical).	Dimensions.	Material.	Cost.						Sale price.	Production per day.	Weaver's earning per day.
			Raw material.	Winding and Twisting.	Dyeing.	Weaving.	Other charges.	Total.			
			Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.		Rs. A. P.
ILKL—*contd.*											
4. Silk Rasta Saree-topa body.	50″ × 9 yards .	Cotton—14 oz. . Silk—8 oz. . .	1 7 0 5 0 0	..	..	4 12 0	..	11 3 0	12 4 0	1⅛ yards	0 9 6
HUBLI.											
1. Kali Chandrakala-plain.	45″ × 9 yards .	Cotton—1 lb. . Indian silk—4 oz. .	1 14 0 2 13 0	..	..	3 4 0	..	7 15 0	8 4 0	1²⁄₇ yards	0 7 5
2. Silk Rasta saree-topa body.	45″ × 9 yards .	Cotton—12 oz. . Indian silk—8 oz. .	1 6 6 5 10 0	..	..	4 14 0	..	11 14 0	12 4 0	1 yard	0 8 8
3. Silk Khaddi Saree-topa body.	45″ × 9 yards .	Cotton—10 oz. . Indian silk—10 oz.	1 2 9 7 0 6	..	..	4 14 0	..	13 1 3	13 8 0	1 yard	0 8 8
4. Khans of silk .	32″ × 19½ yards .	Cotton—2 lb. 6 oz. Silk imported—1 lb. 5 oz.	2 15 6 14 12 3	..	..	12 0 0	..	29 11 9	30 2 0	15·6 inch	0 4 2
5. Khans of art silk	32″ × 24½ yards .	Cotton—3 lb. 9 oz. . Art Silk—2 lbs. .	6 14 6 2 4 0	..	..	9 0 0	..	18 2 6	18 12 0	1 yard	0 5 11
DHARWAR.											
1. Charam silk bordered saree.	42″ × 8 yards .	Cotton—2 lbs. . Silk—3 ozs. . .	1 12 0 1 6 6	..	..	1 8 0	..	4 10 6	4 14 0	1¼ yards	0 4 10

BELGAUM.											
1. Silk bordered Bodice cloth.	32″ × 19 yards .	Cotton—1 lb. 8 oz. Silk—12 oz. . .	3 0 0 7 8 0	..	..	9 0 0	..	19 8 0	19 8 0	1 5/14 yards	0 10 4
2. Saree Silk bordered.	50″ × 9 yards .	Cotton—1 lb. 4 oz. Silk—4 oz. . .	2 8 0 2 8 0	..	..	3 8 0	..	8 8 0	8 8 0	1¼ yards	0 9 4
SURAT.											
1. King Khab No. 1	27″ × 5 yards .	Cotton yarn—2 lbs. Silk yarn—1 lb. .	80 0 0* 20 0 0*	..	..	30 0 0	..	130 0 0	150 0 0	⅓ yard	1 3 2
2. King Khab No. 2	27″ × 5 yards .	Cotton yarn—1. lbs. Silk yarn—2 lb. .	40 0 0* 22 0 0*	..	..	15 0 0	..	77 0 0	80 0 0	⅓ yard	1 0 0
3. Silk saree with gold thread border.	50″ × 5 yards .	Cotton yarn—2 oz. Silk yarn—1 lb. .	5 0 0 20 0 0	..	..	5 0 0	..	30 0 0	32 0 0	1 yard	1 0 0
4. Silk Khan . .	36″ × 5 yards .	Cotton yarn—2 oz. Indian silk—12 ozs.	5 0 0 10 0 0	..	..	4 0 0	..	19 0 0	20 0 0	1¼ yards	1 0 0
5. Silk Satin . .	28″ × 10 yards .	Indian silk—1½ lbs..	10 0 0	..	..	4 0 0	..	14 0 0	15 0 0	2½ yards	1 0 0
6. Silk Coating .	28″ × 20 yards .	Imported Silk yarn —5 lbs.	25 0 0	..	..	5 0 0	..	30 0 0	32 0 0	4 yards	1 0 0
7. Silk Shirting .	28″ × 20 yards .	Imported silk yarn —3 lbs. 8 oz.	17 8 0	..	..	5 0 0	..	22 8 0	25 0 0	4 yards	1 0 0
8. Muga Silk Saree	50″ × 9 yards .	Imported silk yarn —2 lbs.	12 0 0	..	..	2 0 0	..	14 0 0	15 0 0	4½ yards	1 0 0
9. Silk Loongis .	45″ × 3 yards .	Imported silk yarn —½ lb.	3 0 0	..	..	1 0 0	..	4 0 0	4 8 0	3 yards	1 0 0
10. King Khab No. 3 with art Silk.	27″ × 5 yards .	Imported silk yarn —1 lb. Art silk yarn—1 lb.	20 0 0 2 0 0	..	..	8 0 0	..	30 0 0	35 0 0	⅝ yards	1 0 0

* Gold thread.

APPENDIX C—*concld.*

Class of cloth (Typical).	Dimensions.	Material.	Cost.						Sale price.	Production per day.	Weaver's earning per day.
			Raw material.	Winding and Twisting.	Dyeing.	Weaving.	Other charges.	Total.			
			Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.		Rs. A. P.
AHMEDABAD.											
1. King Khab .	28″ × 5 yards .	Cotton yarn—2 lbs. Silk yarn—1 lb. .	82 0 0* 25 0 0*	..	..	25 0 0	..	132 0 0	140 0 0	⅕ yard	1 0 0
2. Silk Pitambar .	50″ × 5 yards .	Cotton yarn—2 oz. Silk yarn—1 lb. .	6 0 0 20 0 0	..	..	5 0 0	..	31 0 0	35 0 0	1 yard	1 0 0
3. Silk Khan .	36″ × 5 yards .	Cotton yarn—2 oz. Indian silk—12 oz.	6 0 0 11 0 0	..	..	4 0 0	..	21 0 0	25 0 0	1¼ yards	1 0 0
4. Silk Satin . .	28″ × 10 yards .	Indian silk—1 lb. 8 oz.	11 0 0	..	..	5 0 0	..	16 0 0	20 0 0	2½ yards	1 4 0
5. Silk coating .	28″ × 20 yards .	Imported silk yarn —5 lbs.	25 0 0	..	..	5 0 0	..	30 0 0	32 0 0	4 yards	1 0 0
6. Silk Shirting .	28″ × 20 yards .	Imported silk yarn —3 lb. 8 ozs.	16 0 0	..	..	5 0 0	..	21 0 0	24 0 0	4 yards	1 0 0
7. Silk Loongi .	45″ × 3 yards .	Imported silk yarn —8 ozs.	3 0 0	..	..	1 0 0	..	4 0 0	4 8 0	3 yards	1 0 0

* Gold thread.

APPENDIX D.

*Consolidated budget of Prefectural Governments under different headings for 1928.**

	Yen.	Yen.
I. Improvement of mulberry—		
1. Expenditure on specialists	162,927	
2. Subsidy	374,402	
3. Miscellaneous	126,996	
		664,325
II. Improvement of rearing –		
1. Expenditure on specialists	577,835	
2. Subsidy for specialists in villages . .	348,969	
3. Subsidy for encouragement of co-operative societies	312,401	
4. Miscellaneous	283,317	
		1,522,522
III. Improvement of seed (eggs) –		
1. Subsidies	44,628	
2. Miscellaneous	7,850	
		52,478
IV. Improvement of reeling—		
1. Expenditure on specialists	153,098	
2. Subsidy for specialists or equipment .	37,532	
3. Miscellaneous	157,801	
		348,431
V. Expenditure on Experimental and Examination Stations –		
1. Torishimari Jo (Controlling stations) .	2,479,832	
2. Sangyo Shikenjo (Experimental stations)	2,112,665	
3. Conditioning Houses	890,924	
4. Teachers	303,458	
5. Miscellaneous	334,741	
		6,121,620

सत्यमेव जयते

National or Imperial Government's Budget for 1927.

A. For the Industry—		
1. Mulberry improvement	22,660	
2. Cocoon improvement	37,000	
3. Disease investigation	173,000	
4. Aid to the Raw Silk Association of Japan (Sanshigyo Do-gyo Kuiai Chuo-Kai) .	13,000	
5. Aid to straw ware and dried cocoon trade	604,800	
6. Experimental stations (Sangyo Shikenjo)	460,000	
7. Silk examining	438,233	
		1,748,693
B. For education—		
1. Kyoto Sericultural College	150,000	
2. Tokyo Sericultural College	180,000	
3. Ueda Sericultural College	180,000	
4. Kogoshima Sericultural College . . .	2,000	
		512,000

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* The Silk Industry of Japan by C. C. Ghosh (Monograph of the Imperial Council of Agricultural Research, 1933).